

# Creating Values. Living Values.





## **An overview of the Messer Group**

The Messer Group, founded in 1898, is the largest privately managed specialist in industrial, medical and specialty gases. Under the brand “Messer – Gases for Life”, the company is active in 35 countries in Europe, Asia, America and Algeria, with a total of more than 90 operating companies. The international activities are controlled from Bad Soden near Frankfurt am Main, whilst the centralised functions of communications, logistics, engineering, production and application technology are managed from Krefeld. Stefan Messer, CEO and owner of the Messer Group, works together with the 5,675 employees in accordance with defined principles. These include a focus on customers and employees, responsible behaviour, corporate responsibility, excellence as well as trust and respect. In 2017 the industrial gases specialist generated consolidated sales of 1.232 billion euros.

This report complies with the G4 Guidelines of the Global Reporting Initiative (GRI). The G4 standard labels in the margin reference the corresponding text to the relevant position in the GRI Content Index (pages 94 to 97).

G4-8, G4-9, G4-10

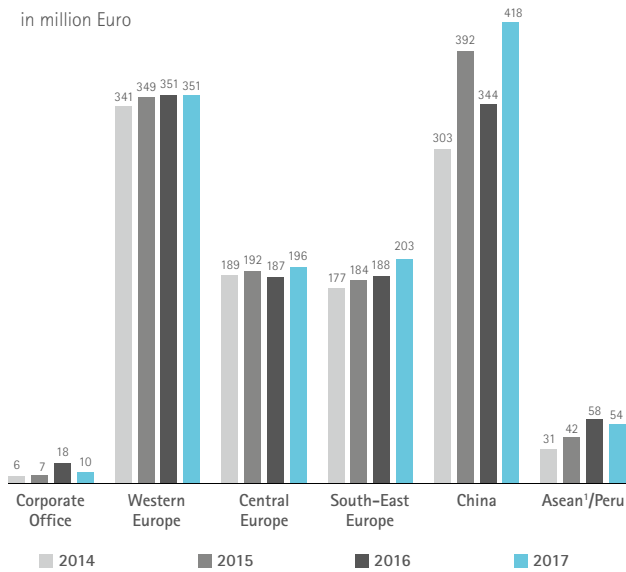
## Key figures of the Messer Group at a glance

As of 31.12.2017

		2014	2015	2016	2017
Net sales	in million Euro	1,047	1,166	1,146	1,232
EBITDA	in million Euro	241	252	249	290
EBITDA margin	in per cent	23	22	22	24
Investments	in million Euro**	205	145	147	144
Employees*		5,444	5,354	5,485	5,675

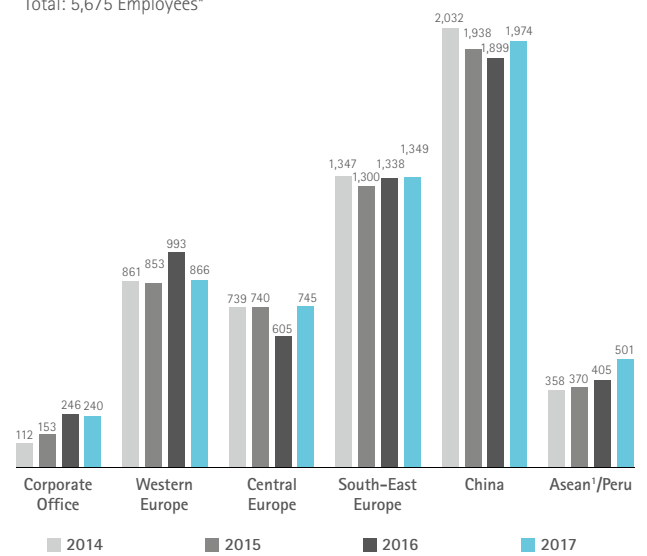
\* contractual employments \*\* incl. IFRIC4

Net sales (consolidated)  
by region  
in million Euro



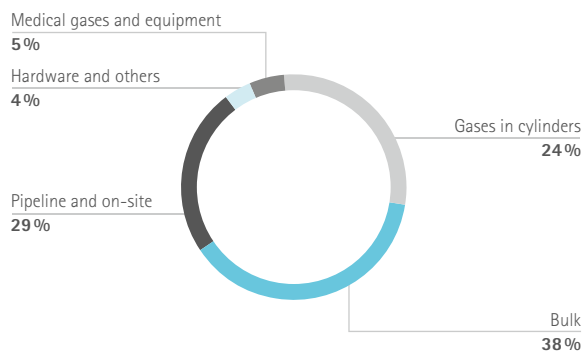
<sup>1</sup> Vietnam, Thailand, Indonesia, Malaysia

Numbers of employees  
by region  
Total: 5,675 Employees\*

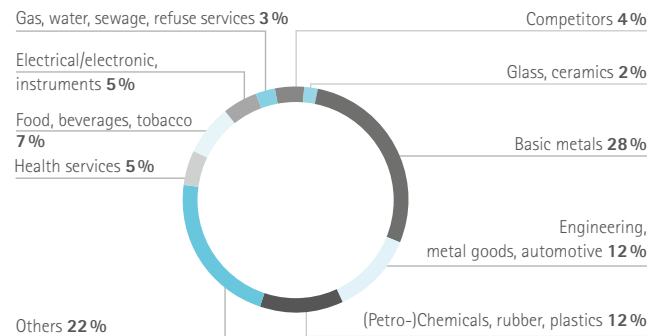


<sup>1</sup> Vietnam, Thailand, Indonesien, Malaysia

Net sales by product groups  
in per cent



Net sales by industry segments  
in per cent










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# Creating Values. Living Values.

The term “values” can and should be understood in different ways. For Messer, it has two key meanings.

On the one hand, there is economic value – that which can be documented with figures and balance sheets. Based on the 2017 financial year, Messer has fully succeeded in creating values: our most important key indicators are above those of the previous year – and also significantly above our own expectations.

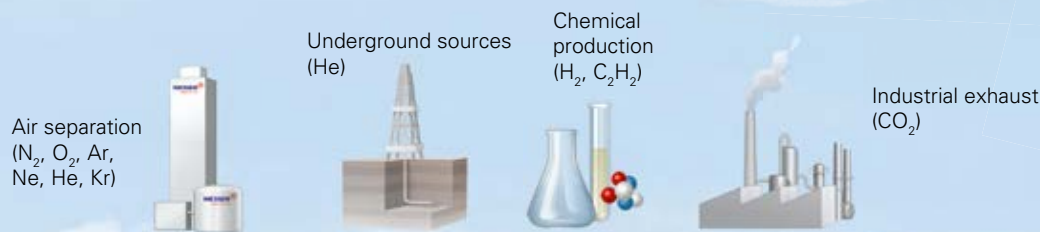
At the same time, values determine our business actions. By 2005, we had already formulated, as part of our Mission Statement, values that are still valid. Today we can say that they are truly lived, day in and day out. And that is precisely the point.

Linking both together – sustainable growth and value-based action – is truly an art. The present report touches on this aspect as well: hand-drawn graphics introduce the various topics and also represent a value in their own way.

# We make gases out of air

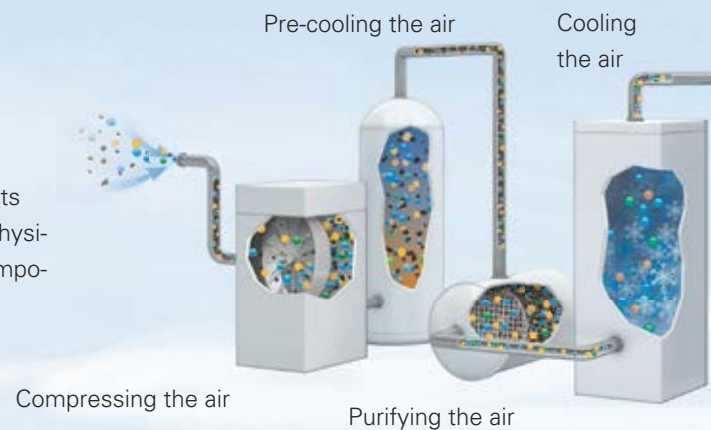
Industrial operations require oxygen, nitrogen, argon, xenon, neon and krypton, along with carbon dioxide, acetylene, hydrogen and helium, and a wide variety of gas mixtures. At Messer we call these gases **Gases for Life**. They are produced in largescale industrial plants and are just as important as water and electric power for many manufacturing processes which make everyday products.

## Where do Gases for Life come from?



## How are Gases for Life produced from air?

In order to produce these gases, we use air separation units which can reach 60 metres high or more. Inside them, a physical process takes place which separates the air into its components. This process is also known as cryogenic distillation.



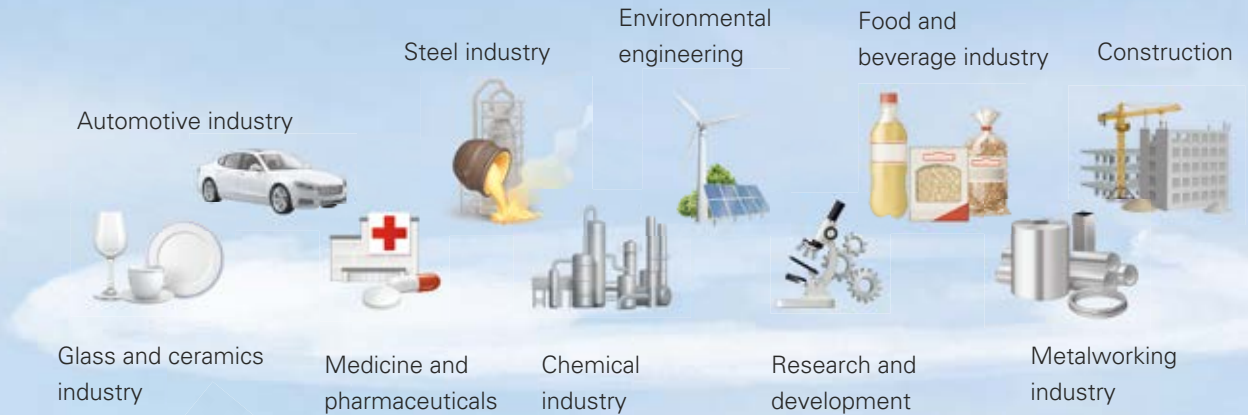
## What is air?

<b>78 %</b>	Nitrogen ( $N_2$ )
<b>21 %</b>	Oxygen ( $O_2$ )
<b>0.9 %</b>	Argon (Ar)
<b>0.1 %</b>	Carbon dioxide ( $CO_2$ ), Neon (Ne), Helium (He), Methane ( $CH_4$ ), Krypton (Kr), Hydrogen ( $H_2$ ), Nitrous oxide ( $N_2O$ ), Xenon (Xe)

Separating the air



## Who needs Gases for Life?



## How are Gases for Life supplied to the customer?

Smaller quantities: Pressurised gas cylinders

Larger quantities: Tanks on the customer's premises, delivery of gases in tank trucks

Major industrial quantities: Air separation units on the customer's premises; alternatively – where available – supply via pipeline





As owner and CEO of the largest owner-managed industrial gases specialist, Stefan Messer has been the driving force behind the strategies adopted for the future.

# Dear Readers,

We are living in turbulent times, with upheavals and changes on all fronts that strongly influence our lives and our work.

Wars, political disputes, the advance of globalisation, scarcity of resources, climate change, demographics, increasingly protectionist tendencies and the digital revolution are just a few examples of the situations and trends we must face every day.

The generations that come after us will grow up in a world different from the one we know. But they, too, will dedicate themselves to the challenges of their time, adapting their lives to changed technologies and conditions. After all, things are not all getting worse – just different.

We cannot and should not halt the advance of technological progress: digitalisation, for instance. It will encompass all areas of our lives, at the same time making many things easier, safer and more convenient for us. We have long since grown accustomed to many improved processes in our daily lives. Thus, Google has banished our tried-and-trusted encyclopaedias; thanks to Spotify, we no longer need CDs if we want to listen to music; with Uber, we can order and pay for taxis online; Google Maps and navigation systems have replaced traditional maps; today, partners for life can be found via Internet portals such as Parship; and booking travel online ourselves is simple and economical. The next steps in this revolutionary process are already on the starting blocks. Autonomous driving, 3D printers or self-replenishing refrigerators will soon become an everyday reality. In industry, the networking of data and machines can make processes more effective, and the approach to and support of customers more targeted. Implementation of Industry 4.0 will make many things even more automated, and thus more effective.

The other side of the coin however, where this digital development is concerned, is that we are all growing more transparent as our data is stored and used by others without our knowledge. The massive upturn in the use of social media such as Facebook, LinkedIn or Instagram, however, also shows that the younger generations have fewer problems with loss of privacy than their parents.

Despite these sweeping developments, the trend for the global economy in the past year was a very positive one. The shift in economic power to Asia has continued, with the greatest rates of growth being achieved once again in this emerging region.

But domestic industry is humming in North America, as well, even though the policies of Donald Trump are returning the focus to the nation-state. Increased reintroduction of customs duties is contradictory to free world trade; and the failure to invest in modernisation in one's own country can quickly place its economy at a competitive disadvantage.

Europe shows signs of recovery with moderate growth rates that are partly stimulated too greatly by the low-interest policy in place at the European Central Bank.

In the global market for industrial gases, the continued concentration on just a handful of major providers has reached a new dimension through the planned merger of Linde and Praxair. It remains to be seen how customers will respond to such a size optimisation, and whether costs and prices will in fact drop as a result of the synergies realised. For the smaller providers such as Messer, this increasingly means operating in market niches and with better service.

In this rather disparate environment, our group of companies has developed outstandingly in the field of industrial gases. Our above-average strength in China emerged very clearly in 2017. But Vietnam, our new rising star, has also developed outstandingly. In Europe, the region of South-Eastern Europe is leading the growth scale, followed by more moderate growth in Western and Central Europe.

After years of moderate growth, in 2017 we were able to strongly boost revenue and results, and more optimal use was made of our capacities in China in particular.

Asia remains our focus for strategic investment. This is why we chose new expansion projects for the construction of air separation units in the provinces of Chongqing, Guangdong, Hunan and Yunnan. Additional projects are in preparation. In Vietnam, this year we signed agreements with our main customer, Hoa Phat, for the construction of two air separation units at the new steel location in the country's centre, along with another, fourth unit for the existing location in the north. In Malaysia we launched our joint venture, UIG, with two filling plants for industrial gases. In Thailand, we founded a new company that started its business activities in early 2018.

In Poland, we took over the local gas company TransMatGaz; in Hungary, we successfully commissioned a third air separation unit; and in France, we signed agreements for the construction of three public filling stations for liquid nitrogen. These form the basis of a climate-friendly system for the refrigerated transport of food by truck; trucks whose engines run on liquefied natural gas, i.e. without using any diesel at all.

Due to the lower capital expenditures in 2017 and the improved results, we were able to make greater reductions than originally planned in our overall net debt. In so doing, we created a financial basis with which to secure our company in the long term with additional investments in our future.

We also registered slight growth in the areas of welding and cutting technology, and in the diagnostic devices of the MEC Group; overall, however, we have fallen short of our expectations. A necessary restructuring of the Castolin Eutectic Group has already been initiated and will lead to improved profitability in 2018. In doing so, we will expand sales and market-related activities while scaling back administrative functions. At Messer Cutting Systems, the strategy was revised through a strengthening of the laser segment. A significant investment programme was decided that will future-proof our products and strengthen our technological prowess. The BIT Group was able to expand its business, most notably in the fields of haematology and molecular diagnostics.

In spite of what are certainly a host of fresh challenges for 2018, we are well positioned and will consistently pursue the strategy we have adopted, both geographically and innovatively. This includes the opening of the new Technical Centre in Krefeld, Germany.

But the new year 2018 also marks another milestone for our family business, as we shall be turning 120 years old this year.

For what has again been a comparably successful 2017, I would like to thank you for your continuous trust, loyalty and cooperation.

Best wishes,

Your

A handwritten signature in blue ink, appearing to read 'Stefan Messer', is written in a cursive style.

Stefan Messer



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## Management Board and Supervisory Board of the Messer Group

Since the founding of the Messer Group in 2004, the Management Board has been supported by a supervisory board which assists with strategic decision making and always demands sustainable measures in addition to business success. The members of our Supervisory Board are considered to be experts in conducting business and always bring their experience to bear in a constructive manner. As such, they are reliable partners to the Messer family and the managing directors.

**Stefan Messer**



**Dr Nathalie von Siemens**



**Dr Hans-Gerd Wienands**



**Dr Werner Breuers**



**Dr Bodo Lüttge**



**Dr Karl-Gerhard Seifert**



**Heike Niehues**



**Dr Jürgen Heraeus**



## Supervisory Board of the Messer Group:

Dr Jürgen Heraeus, Vorsitzender  
Dr Werner Breuers  
Heike Niehues  
Dr Bodo Lüttge  
Dr Karl-Gerhard Seifert  
Dr Nathalie von Siemens

## Management Board of the Messer Group:

Stefan Messer, Chief Executive Officer  
Dr Hans-Gerd Wienands, Chief Financial Officer  
Dr Uwe Bechtolf, Executive Vice President  
Controlling/Accounting & Strategy  
Johann Ringhofer, Executive Vice President  
Engineering & Production  
Adolf Walth, Executive Vice President  
Sales & Marketing


G4-33

## Supervisory Board Report

During the reporting period, the Supervisory Board performed the tasks incumbent upon it in accordance with the statutory provisions and the articles of association and provided support and advice to the Management. The Management reported to the Supervisory Board, both verbally and in writing, concerning the performance and situation of the company within the framework of regular meetings on 6 April 2017 and 23 November 2017. Furthermore, the Supervisory Board was informed about important business transactions and decisions. Legal transactions requiring the Board's approval were submitted to the Board for its decision. The Supervisory Board satisfied itself in the plenum that the bookkeeping, the annual financial statement of Messer Group GmbH and the Group accounts for the year ending 31 December 2017, as well as the management report from Messer Group GmbH and the Messer Group, had been audited and certified by the auditing company KPMG AG Wirtschaftsprüfungsgesellschaft, Essen. The audit reports were discussed at the Supervisory Board meeting on 10 April 2018 with the assistance of the auditors. The Supervisory Board had no objections and expressed its agreement with the auditor's results.

The Supervisory Board would like to thank the Management as well as all employees of the Messer Group for their efforts and successful work in the 2017 financial year.

Bad Soden, 10 April 2018  
The Supervisory Board



Dr Jürgen Heraeus, Chairman



Stefan Messer

Dr Hans-Gerd Wienands

# Corporate Responsibility Report of the Messer Group GmbH

## Commitment to sustainability

G4-1

The Management of Messer Group GmbH is committed to acting in a responsible and sustainable manner as part of its economic and social involvement in society.

### **Stefan Messer, owner and Chief Executive Officer:**

“We recognise and accept our social responsibility towards our employees and society in different areas: the safety of our employees, customers and partners when using our products is our number one priority. We are also committed to protecting our environment and climate by constantly improving our processes and focusing our development on technologies that make our customers’ production processes more efficient and resourcefriendly. Messer has a presence in 35 countries. We respect the cultural differences as well as rights in the regions in which we operate. We contribute to community life and education in these regions through the provision of wide-ranging support.”

### **Dr Hans-Gerd Wienands, Chief Financial Officer:**

“We conduct our business on a sustainable basis and guarantee our autonomy and independence through forward-looking investments. This enhances our customers’ and financial partners’ confidence in us and gives our employees long-term security. We operate with maximum transparency vis-à-vis our stakeholders. Responsible behaviour is an important factor when choosing a business partner. We take this into account by viewing corporate responsibility as a strategic matter and integrating it into our processes.”

G4-15, G4-18

## Strategic integration of corporate responsibility

The key themes concerning our responsibility in economic and social spheres are derived from our own objectives, traditions and innovations as well as from general standards. The core areas are our values as a company, our customers and the markets in which we operate, climate and environmental protection, safety, our employees, and society. Since Messer Group GmbH was founded, we have been pursuing long-term objectives to take the company forward on an independent and profitable footing. We have always observed the principles of the “honourable businessman”, acting responsibly with regard to our place in society. Our corporate responsibility has been strategically embedded in our processes since 2014 through the cross-divisional Corporate Responsibility function. We have set ourselves measurable goals in the different business units to document our improvements and development. We are publishing these goals in this Corporate Responsibility Report for the 2017 financial year, which features comparisons with the results achieved in 2016. These key performance indicators are transparent and comparable, enabling our stakeholders to understand and assess how we are developing. In this context, we support our customers’ aim of checking and ensuring the sustainability of their own activities and supply chains. At our customers’ request we therefore also report to contracted third parties, e.g. Ecovadis, the ‘Carbon Disclosure Project’ and the chemical industry’s worldwide “Responsible Care” initiative.

## Generation of our materiality matrix

G4-18, G4-20,  
G4-21, G4-26,  
G4-27

The key issues we address in our strategic sustainability process are the product of our daily and long-term actions and activities. When evaluating these topics, we consider it important to include representatives of all stakeholder groups. For this reason, we have compiled a diverse list comprising 77 individual topics within the categories of environment/climate protection, economy/business, values, products/services/markets, safety, information/data protection, customers, employees, society and suppliers. In order to differentiate the priorities of our internal stakeholder groups, such as owners, management and employees, 44 senior managers and 282 employees voluntarily completed an anonymous online survey where they ranked the topics on a scale of one to ten, with one being important and ten extremely important. Selected journalists also participated in the anonymous online survey. As in previous years, the safety of our customers and employees is of utmost importance to our company. All important issues can be affected by our decisions and can have potential effects on stakeholders outside the organisation too. For this reason, all major projects, both in-house and external to the organisation, are relevant.

# Materiality matrix

G4-19



- ▲ Values
- ✕ Economy and business
- Environmental and climate protection
- ◆ Employees
- ◆ Customers and markets
- Society
- ★ Safety

G4-19

## Corporate Responsibility

Customer and employee orientation, responsible behaviour, corporate responsibility as well as open communication, trust and respect: all of these are embedded in the Messer Group's mission statement. Shortly after bringing all of the company's shares back into family ownership in 2004, Stefan Messer personally drove forward a discussion of values, which led to a company-wide vision and mission as well as the formulation of the company's values. Ever since the foundation of the Messer Group, we have acted sustainably to meet the needs of our customers in accordance with our collective responsibility for people, progress and the environment. In order to make these values and the corresponding developments measurable and comparable, Messer introduced Key Performance Indicators (KPI) for the first time in 2014. The following twelve key topics are relevant for every Group company:

	Unit	2016	2017
<b>1. Safety of our employees</b>			
Number of Lost Time Injuries (Messer employees)	persons	25	15
Lost Time Injury Frequency Rate - LTI FR (Messer employees lost time injuries)	per million working hours	2.4	1.4
Lost Time Injury Severity Rate - LTI SR (Messer employees lost days)	per million working hours	77.9	45.4
Number of Recordable Working Injuries - RWIs (Messer Employees)	number	88	37
Recordable Working Injury Frequency Rate - RWI FR	per million working hours	8.3	3.5
Fatalities (Messer employees)	persons	0	1
<b>2. Safety of our logistics</b>			
Cylinder fleet: Number of preventable incidents	number	12	4
Cylinder fleet: Frequency Rate (Number of preventable incidents)	per million driven kilometres	0.48	0.17
Bulk Fleet: Number of preventable incidents	number	31	13
Bulk Fleet: Frequency Rate (Number of preventable incidents)	per million driven kilometres	0.49	0.15
<b>3. Safety of our customers</b>			
Total number of customer installations (Messer owned)	number	8,390	8,808
Number of technical reviews of customer installations	number	8,255	9,171
Ratio: Number of technical reviews / Number of Messer owned customer installation	number	0.98	1.04
Number of safety audits at customer sites with Messer's installations	number	1,299	1,582
Ratio: Number of safety audits at customer sites / number of Messer owned customer installations	number	0.17	0.18
Number of safety trainings provided to customers at any customer site	number	1,492	1,590
Total number of customer training participants	persons	4,366	4,716



	Unit	2016	2017
<b>4. Mutual trust and respect</b>			
Number of cases reported in respect to discrimination	number	1	1
<b>5. Energy efficiency in production</b>			
Specific power (energy consumption in relation to sold product)	kWh	1.368	1.345
<b>6. Open communication and cooperation with stakeholders</b>			
Media resonance analysis: Gross coverage	persons	47,746,755	54,879,920
Brand awareness (Germany)	per cent	14.3	12.8
<b>7. Protection of the environment</b>			
CO <sub>2</sub> -Footprint of plants and logistic	million tonnes of CO <sub>2</sub> e	3.02	3.36
Specific CO <sub>2</sub> Footprint of plants and logistic	million tonnes of CO <sub>2</sub> e / '000 EUR	2.63	2.73
Number of production / filling companies in EU certified to ISO 14001	number	21	21
Number of new customer installations (bulk) for applications which protect the environment	number	187	253
<b>8. Independence of our family-run company</b>			
Net Debt/EBITDA-Ratio	number	1.52	1.00
EBITDA/Sales-Ratio	per cent	21.7	23.5
<b>9. Customer satisfaction</b>			
Number of participants in customer satisfaction surveys across the Group	persons	1,343	1,326
Per centage of credit notes in relation to number of invoices issued	per cent	1.7	1.5
<b>10. Employee satisfaction</b>			
Average length of service	years	10.4	10.6
Staff turnover rate	per cent	5.6	6.9
Sick days per employee	persons	3.8	4.4
<b>11. Employee development</b>			
Expenditures on training programmes per employee	Euro	296	277
Training days per employee	days	3.75	3.38
Apprentices and trainees in total workforce	persons	49	41
<b>12. Compliance</b>			
Inquiries submitted to the "Ask us help desk"	Compliance cases reported	1	0



# Our Values







G4-56, D4-DMA  
Independence,  
secure finances/  
sustainable  
economic resources

# Our Values

## Company History

Today, Messer is the largest owner-managed industrial gases manufacturer worldwide. The company was founded in 1898 by Adolf Messer, Stefan Messer's grandfather, in Frankfurt am Main. Under the leadership of Dr Hans Messer, Stefan Messer's father, the company went through a process of development in the 60s to become a supplier of industrial gases, cryogenic systems, and welding and cutting products. Hoechst AG, subsequently Aventis, held a two-thirds majority stake in the Group; the other third was held by the Messer family.

At the beginning of the 90s, Dr Hans Messer retired from active management of business operations and joined the Supervisory Board.

In 2001, Hoechst sold its two-thirds majority shareholding to financial investors. With their help, Stefan Messer managed to return large parts of the company to full family ownership in 2004. As an independent family entrepreneur, Stefan Messer built on his father's earlier successes. He and his team managed to turn things around for the long-established company, which many at the time had written off as a failure. Under their management, and with the new "Messer - Gases for Life" brand, the company has doubled its sales to over a billion euros.

Messer consistently aligns all its actions to a specific set of values. The strategy followed by the Messer Group has always been based on the company's vision, which was developed and is lived by its managers, to be the preferred choice for its customers and employees. The Company Mission Statement consists of this vision as well as the mission and the six corporate values: customer and employee focus, responsible behaviour, corporate responsibility as well as open communication, trust and respect.

# The Mission Statement of the Messer Group

Messer is an independent, owner-managed family company producing industrial gases with a focus on Europe and Asia.

We act sustainably to meet the needs of our customers in accordance with our collective responsibility for people, progress and the environment.

## Our Way

In 2004 the “Dubrovnik Contract” articulated our corporate-wide mission statement including our vision, mission and values according to which Messer would henceforth operate. Today we can say: we have succeeded in shaping a living corporate culture from the words contained in that contract.

For this exceptional development we owe a debt of gratitude to our staff. Thanks to their hard work and loyalty, it was possible to unleash the power hidden behind this vision, this mission and these values.

More than that, a guiding principle has emerged that can power our success far beyond business units and borders wherever they might be. This is Messer and this is our way.

## Our Vision

Messer is an important industrial gases group in its core markets of Europe and Asia. Messer is and will remain an independent family-run business. We think and act decisively for the long term and measure ourselves by our sustained success.

Together with our partners and associated companies in the field of wear, fusion, and cutting technologies as well as precision instrumentation we develop synergies and meet our customers’ needs expertly, reliably and with a flair for innovation.

This is what makes us the first choice for our customers and employees.



## Our Mission

As an owner-managed family business with a rich tradition we are focused on the future whilst taking into account the different conditions in our existing markets. We also use our experience and expertise to building up our position in new markets.

Ranging from acetylene to xenon we offer our customers a wide range of technical and medical gases and food and specialty gases. Our product range is completed by our excellent services and state-of-the-art technical plants and equipment.

In our highly modern technology centers we work together with our customers to develop application technologies for the use of gases in almost every industry, in food technology, medicine, science and research.

Our efficient and dedicated employees, our flexibility and the closeness we feel to our customers in local markets makes us their preferred partner.

Through entrepreneurial flair, farsighted thinking and the continuous improvement of our processes, we create added value for our customers and so secure our mutual success in the long term.

Solid finances and fair profits guarantee our independence and support sustainable growth.



Our "corporate tree" just keeps growing. You can see it in the lobby of our Headquarters in Bad Soden.

## Our Values

### Customer orientation

We are focused on the individual requirements of our customers and help them to improve their competitiveness and their performance.

### Employee orientation

We train, develop and promote motivated and efficient employees with integrity. We expect our employees to be resourceful and responsible team players.

### Responsible behavior

We take our social responsibilities towards our employees and to society very seriously:

- Safety: we are committed to the safety of our staff and the safe production, handling and use of our products.
- Health: we set working standards that ensure sound health and well-being for every individual.
- Environment: as a member of the wider society, we are committed to protecting the environment.

### Corporate responsibility

By responsibly managing our resources and applying the talents of our employees we are increasing the worth of our company in the long term.

### Excellence

Our actions are based on technical expertise, innovation, flexibility and the ability to make quick decisions.

### Mutual trust and respect

We believe that cooperation is based on trust, sincerity, transparency and frank communication. We respect and abide by the culture and social customs of the countries in which we work.

## Engagement in the Economic Sphere

At Messer, there is wide-ranging engagement on the part of owner and CEO Stefan Messer, CFO Dr Hans-Gerd Wienands, the Supervisory Board, executives and employees alike. This makes it possible to widen the scope for action and exchange market-related experience via networks and cooperative initiatives.

### The owner's personal commitment

As Vice President and member of the General Assembly of the Frankfurt am Main Chamber of Commerce and Industry (IHK), Stefan Messer holds the office of Chairman of the foreign trade committee there and was also a member of the foreign trade committee of the German Association of Chambers of Commerce and Industry (DIHK) in Berlin up until 2017. Furthermore, he is an Honorary Senator of the Technical University Darmstadt and Honorary Senator of the Goethe University Frankfurt, as well as a member of the board of trustees of the Faculty of Economics and on the board of trustees of the China Institute at the Goethe University Frankfurt. In addition, he is a member of the board of the German-Swiss Chamber of Commerce, a member of the advisory committee for the FrankfurtRheinMain economic initiative, a member of Commerzbank AG's advisory committee for the state of Hesse and a member of HDI Gerling's state advisory committee. He is also a member of the executive board of the Friends of the German-Vietnamese University and sits on the board of Dachser Group SE & Co. KG. Since January 2009, Stefan Messer has been Honorary Consul of the Republic of Slovenia for the consular district of Hesse, Rhineland-Palatinate and Saarland. Stefan Messer is also involved in ASU – Die Familienunternehmer, an association of family entrepreneurs that supports the fundamental values

of a social market economy, in particular free enterprise. Furthermore, Stefan Messer is a member of the steering committee and board of the East Asian Association (OAV) and Chairman of the inter-state committee on Thailand.

### Involvement in industry associations

The Messer Group is a member of the European Industrial Gases Association (EIGA). The Brussels-based association represents nearly all European companies that produce and market industrial, medical and food gases. The association's members cooperate with the aim of achieving the highest possible safety and environmental standards during the production, transport and use of gases. At the beginning of each workshop organised by the EIGA, the members are reminded of the importance of complying with the "EIGA anti-trust meeting rules". Messer is also a member of the IOMA (International Oxygen Manufacturers Association), the German Committee on Eastern European Economic Relations and the German Asian-Pacific Business Association (OAV). Messer employees are represent in all governing bodies of these associations.

The Messer Group is a member of the German Welding Society (DVS). The DVS is a non-profit, technical and scientific association based in Düsseldorf. Messer is also involved in the family business association "Die Familienunternehmer e.V.", in the FBN Family Business Network and in the FrankfurtRheinMain e.V. economic initiative.

Messer employees are involved in expert committees, support research projects, and establish and maintain contact with expert groups in technologically advanced fields. The subsidiaries are engaged in various local industry associations. The Messer companies are also involved in organisations in their local regions.

G4-16

### German delegation tours Croatian production site

On 9 May 2017, a German delegation visited the Messer production site in Zaprešić, Croatia. Together with Hessian Minister President Volker Bouffier, 15 parliamentarians visited a plant that produces the air gases oxygen, nitrogen and argon as well as a gas cylinder filling operation. In a presentation, Robert Mustač, Managing Director of Messer in Croatia, reported on his experience with launching the German company on the Croatian market: "The success of the past 25 years was the result of bundled German and Croatian know-how in combination with an organised process." The delegation's itinerary was organised by the German-Croatian Chamber of Industry and Commerce.

## Messer Compliance Management System

The Messer Compliance Management System (Messer CMS), which we implemented in 2010, is an organisational concept that describes the Messer Group's system of values and its practical implementation and defines the responsibilities derived from it. It constitutes a mandatory framework for resolving conflicts of interest and ensuring compliance with applicable laws, regulatory provisions and the inter-company and company-internal policy guidelines within all divisions of the Messer Group. The managing directors and senior management are fully committed to the Messer CMS. As a system of values, its purpose is to establish a relationship with our customers, partners and employees as well as with our competitors, the public and the media, based on fairness, solidarity and

G4-DMA  
Compliance



Hessian Minister President Volker Bouffier accompanied 15 German parliamentarians on a trip to Croatia where they toured a Messer plant that produces the air gases oxygen, nitrogen and argon as well as a Messer gas cylinder filling operation.

trust, to resolve conflicts of interest and ensure compliance with the applicable laws, regulatory provisions and inter-company and company-internal policy guidelines within all divisions of the Messer Group. The CMS, which has been developed for this purpose, supports those responsible in setting up and implementing the organisational concept. The aim of the organisational concept is to prevent breaches of the Messer Code before they occur.

### **The Messer Code**

The management of Messer Group GmbH has summarised the principles for the organisational concept in a set of rules (the “Messer Code”). The Messer Code stands for active corporate governance and is intended as a guide to all employees in their day-to-day working life while taking into account the Messer Mission Statement. Managing directors must take suitable measures to ensure that all employees have unrestricted access to the Messer Code and are aware of where and how it can be consulted.

The Messer Code of Conduct is the core document within the Messer Code. It is supplemented and given substance by the Group Guidelines as well as other binding internal regulations. Our employees are obliged to observe applicable laws and the rules of the Messer Code when performing their work. We also expect our business partners, customers and other parties who work with Messer to observe applicable laws and the principles of the Messer Code.

### **Compliance officers**

The management of Messer Group GmbH bears responsibility for monitoring the Messer CMS. This organisational concept is binding for all managing directors, senior management staff and employees of the Messer Group.

The local managing directors are responsible for implementing this organisational concept in their own national subsidiary and ensuring that it is adhered to while observing applicable legal regulations. The board of Messer Group GmbH has appointed a Corporate Compliance Officer (CCO) to support the managing directors and the supervisory bodies in their duties. In addition, there are Local Compliance Officers (LCOs) who are designated by the regional directors in consultation with the respective national managing directors. The team of compliance officers is supplemented by the corporate departmental heads in the Corporate Office, who act as department-specific compliance officers (BCOs). The management of the Messer Group GmbH has defined the general tasks, rights and obligations of the compliance officers in a Compliance Officer Guideline document. Managing directors, senior management, the CCO, LCOs and BCOs also serve as role models. They are expected to demonstrate a high degree of social and ethical competence.

Managing directors and senior management are expected to demonstrate an appropriate degree of organisation, leadership, communication, selectivity, oversight and direction in their activities. Moreover, they are obliged to protect customers, employees and the environment. In this context, a clear commitment to conducting business in compliance with the law is just as essential as preventing and disciplining illegal practices.

### **Training programme**

Besides traditional classroom training, there are webinars and e-learning courses given on selected topics relating to the Messer Code. The corporate departments, and the local management and departments generally decide on the content of the courses and the employees to be trained. They assume responsibility for arranging and giving the training courses, supported by external service

providers as necessary, and ensuring that proper documentation is issued. The Messer Group management may mandate training courses and specific course content as well as the group of employees to be trained.

### **Reporting and auditing**

A whole range of matters is subject to a specific approval and reporting process governed by the Group Guidelines, by the largely standardised articles of association, by the rules of procedure for the boards of management of the (national) subsidiaries, by an approval and information list stipulating decision-making responsibilities among local management and their boards, regional management, corporate management and the Executive Board as well as the Supervisory Board of Messer Group GmbH, by signature regulations based on dual responsibility, and by separate requirements issued by the corporate divisions.

In addition to this, local, regional and departmental meetings are held regularly to discuss and coordinate topics and to exchange and report on experiences. The most important procedures at Messer are defined and often certified (e.g. ISO, GMP). Existing organisational structures are used to ensure adherence to the Messer Code. Each department, the regional managers and the management bodies have direct responsibility. Thus, each area of responsibility is accountable for ensuring implementation and observation of the Messer Code. The Internal Audit team, supported by Corporate Legal and representatives of other departments, performs regular audits of all national subsidiaries which last several days. During the process, matters pertaining to the Messer Code (e.g. articles of association, rules of procedure, signature regulations, training provided, compliance with the reporting procedures, etc.) are also examined in detail. Individual departments also perform

other detailed audits (e.g. SHEQ, Medical, IT). Findings and suggestions for improvement are documented in a report which is submitted to the Messer Group Executive Board.

Follow-up audits are performed within a set time period to verify that the suggested improvements have been implemented.

Every three months, pending and threatened/imminent legal disputes which exceed a certain value/risk are queried centrally and the facts of the case, dispute value, process status, process risk and financial provisions already made or which may prove necessary are recorded. The managing directors/LCOs and BCOs are obliged to inform the CCO of any suspicion of a serious breach of the Messer Code. The CCO shall report to the Messer Group GmbH Executive Board and the Supervisory Board on a regular basis, and on request in specific cases, any serious breaches of the Messer Code of which he or she has been informed in a timely manner or otherwise once a year.

Once a year, all national subsidiaries and corporate departments report any issues relevant for the Risk Report to the Vice President Internal Audit. This is discussed by the Messer Group Executive Board, which then decides on any further measures that may need to be taken. These are then submitted to the Messer Group Supervisory Board along with further explanations as needed for information purposes.

### **Reporting in the event of compliance infringements and justified cases of suspicion**

The managing directors and senior management must organise their area of responsibility such that reports from employees about infringements of applicable law or the Messer Code ("compliance infringements"),



as well as justifiable cases of suspicion, can be submitted to them in a timely manner in order to ensure that prompt remedial action can be taken. Part of the reporting process involves creating a report which records the action taken in response to confirmed compliance infringements. This includes a description of how the incident was investigated, how the consequences of the wrongdoing were established and what decision was made regarding further action.

The managing directors must take suitable measures to ensure that all employees are informed about how and to whom breaches of the Messer Code are to be reported, including publishing a telephone hotline number and the compliance e-mail address. A total of 69 suspected compliance infringements were reported in 2017 (previous year: 49 suspected cases). This figure breaks down as follows: 29 in the Western Europe region, 17 in the Southern/Eastern Europe region, 5 in Central Europe and 18 in Asia.

#### **List of Approvals for the Supervisory Body revised**

The List of Approvals for the Supervisory Body has been completely revised. Also known as the List of Approvals for short, it is posted together with the CMS documents on the Messer intranet. The list is preceded by general principles. The legal transactions requiring formal approval remain largely unchanged. What has changed are the value thresholds and the persons and/or bodies to be informed and involved, and/or whose approvals are required, for specific legal transactions.

The list clearly stipulates who must be involved under which circumstances and how. It is understood as defining only the minimum required actions in each case. The regional directors can, where necessary, expand those requirements and impose more stringent requirements for a company from their region.

The List of Approvals for the Supervisory Body is a legally binding document of the Messer CMS. It constitutes a mandatory framework for resolving conflicts of interest and ensuring compliance with applicable laws, regulatory provisions and the inter-company and company-internal policy guidelines within all divisions of the Messer Group.

## **Company Reputation and Brand Awareness**

In contrast to many other businesses and our competitors, “Messer” is not a made-up company name. It is the name of the Messer family and it lends the company, as a family business, and its products a special identity and standing.

The company slogan “Gases for Life” is an integral part of the Messer brand and plays an important role in the international marketing of our products and services. By associating our brand with positive connotations, we are looking to gain long-term competitive advantages through emotional branding. To this end, we regularly evaluate the Messer brand’s reputation scores and the media response in Germany.



Every year, a telephone survey is carried out in Germany to measure brand awareness. At the end of 2017, 1,068 people took part in the survey in the German cities of Bad Soden, Dortmund, Duisburg, Frankfurt/Main, Freiburg, Hamburg, Cologne, Konstanz, Krefeld, Oberhausen, Siegen and Stuttgart. In response to the unprompted question "Which manufacturers of industrial gases can you name?", 12.8% of those surveyed answered with "Messer" or "Messer Griesheim"; in the previous year, that figure was 14.3%. As a manufacturer of industrial gases, Messer is particularly well known in the cities of Bad Soden (47%), Siegen (22%) and Krefeld (19%), where Messer is active.

## Open Communication with our Stakeholders

G4-24, G4-25, G4-26, G4-DMA Open communication and cooperation with our stakeholders

The basis for a good relationship characterised by familiarity and trust can only be created through open and honest communication. This is why keeping in regular contact with customers, suppliers, partners, employees, industrial firms and organisations, with the media, our neighbours, the general public and the internet community – and not forgetting our valued retirees – is so important to us. Our communication channels are as varied as the needs of our stakeholders. Information about the Messer brand, product features or special technologies has to be compiled and made available in a suitable format, and it should be easily accessible. Messer uses a variety of channels to do this. At Messer, the tools used for external communication are just as important as those used for internal communication. These include our corporate internet, press and public relations work, trade show appearances and exhibitions, image brochures, business reports, sponsoring and a customer magazine entitled "Gases for Life", which appears quarterly, as well as a website of the same

name: [www.GasesforLife.de](http://www.GasesforLife.de). When it comes to press and public relations work, Messer maintains close contact with both the regional press as well as business and specialist publications and, in particular, with journalists. In 2017, Messer Group further intensified its public relations work, above all in social media – but also achieved high reach levels in classical media. It issued 25 press releases over the course of the year.

The media response analysis shows that Messer attained a gross reach of 54.9 million people with its publications in independent online and print media. Media reach is determined according to standard criteria to ensure comparability. Gross reach indicates the number of people contacted. In 2016, a gross of 47.7 million people was reached. As in the previous year, all of the reports published about Messer in 2017 were positive and provided an accurate picture of our business activities.

### Our company profile at [www.messergroup.com](http://www.messergroup.com)

Messer Group's self-portrait can be found on the internet under [www.messergroup.com](http://www.messergroup.com). With an average of 10,000 visitors accessing our European web pages each week, our internet presence is the ideal platform for finding out more about Messer's activities, its products, services and applications, as well as to learn about its history and what makes this family business special.

### The Annual Report

Messer combines its Group Management Report and its Corporate Responsibility Report in an Annual Report, which is made available both on the internet and in printed form. Messer's latest Annual and Corporate Responsibility Reports are always available for download from [annualreport.messergroup.com](http://annualreport.messergroup.com). Our CSR report is audited and certified by the "Global Reporting Initiative" (GRI). The

G4-30

GRI has been in existence since 1999, with one of the founding members being the United Nations Environment Programme. According to the GRI, its aim is “sustainable development through comparability and transparency among companies and organisations”. Any company or organisation that would like to have its CSR report certified by the GRI has to publish up to 120 key performance indicators from ten areas.

These include working practices, social commitment, human rights, ecology and economy. Another partner of ours is the French company EcoVadis. They analyse – also on behalf of some of our customers, such as Coca-Cola – the sustainability of companies based on 21 environmental, social, ethical and supply chain criteria. Coca-Cola has been selecting its suppliers based on these criteria for years, reviewing them once a year. This, in turn, led to Messer’s decision to start producing CSR reports. By achieving our key performance indicators and making them transparent, we can attract the attention of sustainable companies and become their preferred supplier of gases.

All of the annual reports from 1964 to the present day are available for download on the company website [www.messergroup.com](http://www.messergroup.com). The archived annual reports and the outlines of the economic environment in which the company was then operating (written by historian Dr Jörg Lesczenski) chart the economic cycles, the growing intertwining of global economies and the rise of new boom regions that presented Messer Griesheim GmbH (formed in 1965) with increasing challenges in the last third of the 20th century and continue to have a significant bearing on the development of the Messer Group today.

### Gases for Life – The industrial gases magazine

Our industrial gases magazine was conceived for readers who are already acquainted with Messer and want to find out more about our diverse business. It is published three times a year in German, English, Hungarian, Slovakian, Spanish and Czech.



### Gases in everyday life at [www.gasesforlife.de](http://www.gasesforlife.de)

[www.gasesforlife.de](http://www.gasesforlife.de) gives examples of applications and processes that use gases in all aspects of our lives, such as nutrition, leisure, healthcare, communication, mobility, environmental protection, science and home life. The information is written in a comprehensible manner and aimed primarily at a lay audience, rather than technical experts or those whose work involves the use of gases. The target groups of our website include journalists, teachers, students, school children and consumers. All images and text material can be downloaded for free.

### GaseWiki at www.gase.de

GaseWiki is a free encyclopaedia about the world of gases which is written by voluntary contributors rather than by a permanent editorial team. This Messer initiative is intended to provide a structured, comprehensive presentation of knowledge on specific topics as well as information about every aspect of the world of gases. Knowledge is central to GaseWiki: in no way is it attempting to compete with the much bigger Wikipedia, upon which it is modelled. GaseWiki is a collection of pages which thrives through the propagation of knowledge about gas-related topics. Besides reading the pages, any visitor can also edit them or even add new ones.

### Messer in social media

Social media are often the first port of call for people who are looking for information about products or a company. Even in times of crisis, the public gets its information via social media channels first. Not all of these networks are available in every country, however, which is why their use can vary significantly from region to region. In order to be able to respond to changing communication habits, Messer Group operates official accounts on Facebook, Google+, Twitter, Xing, Instagram, LinkedIn and YouTube.

Many of Messer's subsidiaries also have an active social media presence where, among other things, they exchange information with friendly organisations and educational institutions.

The video portal YouTube is considered to be the world's second largest search engine and is the third most frequently visited platform after Google and Facebook. With its vast range and tremendous number of visitors, YouTube is an attractive medium for companies like Messer: it can reach (potential) customers, partners, employees and the general public the world over. For more than four years now, Messer has maintained its own "YouTube channel", where we offer, among other things, web tutorials. In 2017, these explanatory videos emphasised the secure, safe handling and transport of gas cylinders along with their correct connection. The aforementioned videos are one of the many actions taken within the framework of our "Focus on Cylinders" strategy project.

According to published statistics, 328 million people worldwide currently use the social media platform Twitter. In 2017, Messer Group tweeted 140 times. Those tweets focused on current events involving our "Gases for Life", whereby the overarching goal was to raise our brand awareness. Our national subsidiaries are active online, too: via Facebook and LinkedIn, for example, Messer Hungarogáz addresses its customers directly: amusing content about gases in everyday life increases brand awareness, while reports on projects, company events and careers reinforce business contacts and help gain new customers and employees. We use Facebook mainly to publish emotional information reflecting daily life at the company. In December 2017, every day employees from 24 countries posted short videos in their native language. For Messer, this special Advent calendar was a statement



for international cooperation and mutual understanding.

### Employee communication

The communication strategy, developed by the Messer Group's Corporate Communications Division together with the communication officers from the (national) subsidiaries, contains communication goals and the measures for achieving them, which are necessary for the implementation and continuity of our corporate strategy.

Messer uses an intranet portal for the purpose of internal communication to which all employees have access. Messer uses the intranet to publish current information about the company, as well as the group's mission statement and corporate strategy. It also provides access to the Messer Compliance Management System and various other guidelines and manuals. Messer began work on the redesign of the MesserNet portal in 2016. The updated portal was launched in January 2018.

The employee magazine "Messenger" is published quarterly in German and English – in print and in digital form – with one of the four issues being a special print issue. The magazine's content is divided into three themed sections – Projects, Strategy and People.

In addition to this, Messer communicates highly informative corporate news to all company staff in the form of a timely newsletter issued in German and English via e-mail and the MesserNet.

## General Data Protection Regulation

As a result of the worldwide growth of digitalisation, the EU has enacted the General Data Protection Regulation (GDPR) to protect personal data. This regulation will go into effect in May 2018. For the Messer Group, a project team was named to implement these requirements in all national subsidiaries. The team will define and document measures and rules that guarantee sustainable data privacy within the Messer Group.

The scope of the GDPR covers all European and non-European states where personal data are processed in the EU context. Requirements are more stringent and more extensive than those of the German Federal Data Protection Act or other data protection regulations specific to individual German states. Failure to comply with them carries reputational and financial risks that could negatively impact customer and employee trust as well as the integrity of the Messer Group as a business. With growing public awareness, exposure risk is also increasing: the broad range of publicly available information is drawing more and more attention to the Messer Group. It is becoming easier and less expensive for authorities to implement the regulations. The financial risks have increased significantly: GDPR violations can incur fines of up to 4% of the global annual turnover of the Messer Group.



## Messer Group Awards in 2017

### Switzerland: Rating Certificate

In 2017, for the seventh consecutive year, credit rating agency Bisnode D&B Schweiz AG awarded Messer in Switzerland a Rating Certificate with Risk Indicator 1, which represents a minimal default risk. Only two per cent of all companies in Switzerland meet the conditions for this top category. The certificate distinguishes Messer in Switzerland as a trustworthy, reliable, economically healthy and stable business partner. Bisnode D&B is a partner in the network run by Dun & Bradstreet, the world's largest service provider for business-to-business economic information.

### Award-winning jury member

Stefan Messer was one of seven high-calibre jury members tasked with selecting the medium-sized companies that received the

Axia Award 2017. Just at the end of 2016, Stefan Messer himself was honoured for his performance with the Axia Award in the "Best family-internal successor" category. His current commitment is helping to raise Messer's brand awareness further. The Axia Award is presented to medium-sized German companies in recognition of their sustainable success by the audit, tax and consulting specialist Deloitte, the German business magazine *WirtschaftsWoche*, and the Federation of German Industries (BDI).

### Honouring commitment

Messer Tehnopljin is a proud sponsor of the "Festival djecije umjetnosti" ("Children's Art Festival"). It is the first international event of its kind in Bosnia-Herzegovina, promoting children's art by supporting the publication of the best fairy tales written by primary school pupils. Messer was one of the sponsors of the event, which was held in Sarajevo in May



On behalf of Messer Tehnopljin, Valentin Ilievski (right), Managing Director of Messer in Bosnia-Herzegovina, accepted the tribute from Fahrudin Kućuk, Managing Director of the festival.

2017. For our efforts, we received a letter of thanks along with, among other things, a copy of "Bajkodrom" ("World of Fairy Tales"), the storybook created in connection with the competition.

#### **Award-winning operations in Serbia**

At a formal awards ceremony in December 2017, the Chamber of Commerce and Industry of Serbia recognised Messer Tehnogas

for its dedicated work, its social commitment and its business successes, which have contributed significantly to the development of the Serbian economy. This places Messer Tehnogas among the country's top companies in that category. The presentation of this award was initiated on 24 January 1969 by a resolution of the Assembly of the Chamber.



On behalf of Messer in Serbia, Ernst Bode, Management Director Messer Tehnogas (centre), accepted the award.



# Our Employees







# Our Employees

G4-LA1

## Staff structure and length of employment

As at 31 December 2017, the Messer Group had 5,675 employees, 77% of whom were male and 23% female. There were a total of 610 new entrants. A total of 2,854 employees work in the commercial areas. 300 members of staff are first- and second-tier managers – 23% of whom are female. The number of part-time employees dropped from 140 in 2016 to 121 in 2017. The number of employees on fixed-term contracts also fell from 235 to 204. Our entire staff includes 28 people with disabilities. In total, 69 employees are actively involved in supervisory bodies.

Across the Group, the average length of service of our staff since the date of joining was 10.6 years in 2017. Total staff turnover thus increased slightly, from 5.6% to 6.9%. Likewise, the number of sick days per employee increased slightly, from 3.8 in 2016 to 4.2 in 2017. This does not include employees who have been off sick for more than six months.

## Training and Professional Development

Messer employees are encouraged to make suggestions regarding their own advancement in the regular employee appraisal. In 2017, the average amount spent on training and professional development was 272 euros per employee. In the previous year, the figure was 296 euros. The average number of training days per employee stood at 3.38 per year. The proportion of apprentices and trainees

G4-DMA Training and education, G4-LA9



Messer Group "Junior Circle 2" graduation



fell again, however. In 2017, Messer trained a total of 41 employees; the figure for the previous year was 49.

G4-LA10

There are separate training plans at Group level for young executives. The Academy Messer Group launched its third "Junior Circle" international support programme in 2017. The concept comprises intercultural training and a focus on a variety of topics for staff working in different fields. 70% of lectures are given by Messer's own experts while about 30% are provided by external speakers. The "Junior Circle" extends over a period of two years and involves five one-week training courses. More information on training opportunities at Messer and the "Junior Circle" programme for young executives can be found in the affiliated Group Management Report 2017 for Messer Group GmbH.

G4-DMA

Non-discrimination

## Employee Orientation and Integrity

### Financial parity

Our salaries are based on an employee's function, the market, performance, training, experience and seniority and, where indicated, on collective agreements and inflation compensation. Equal treatment of the sexes is self-evident.

### Equal treatment and anti-discrimination

G4-HR3

If employees feel discriminated against or that they are not being treated equally, they can, at any time, turn to their local human resources manager or the Group Compliance Manager, who are obliged to deal with the matter and ensure that equality is maintained.

The employee may also choose to put this on record during his or her annual appraisal. In such cases, provided it is a minor infringement, the possibility of resolving the problem through mediation or equivalent coaching is discussed in consultation with the parties involved. A serious violation may, however, result in the person who committed the violation having their employment terminated. One case of discrimination was reported in 2017.

### Internal social partnerships

G4-11

1.4% of our employees are members of a works committee. At most of our Eastern European national subsidiaries, the local management negotiates joint pay agreements with trade unions. The relationship between our workforce and the management is one that is characterised by trust, resulting in not a single strike or anything similar within the Messer Group in 2017.

## Employee motivation and integration

### Hungary: Team building out in the open

'Our team spirit makes us strong' and 'We enjoy the freedom we need to achieve': these Messer employer branding statements are consistently applied in practice at Messer Hungarogáz – including through initiatives that are slightly out of the ordinary. On 25 May 2017, a staff picnic was organised on the grounds of our head office in Budapest. Such measures allow us to boost staff motivation and commitment, support the integration of new employees and reinforce the Messer employer brand.

### France: Welcome to Messer

As a partner in the joint venture Soprogaz, Messer took over operation of the air separation plant at the Beauvais site in June 2017 – and five new employees, too. An informal breakfast and orientation seminar were

organised so everyone could get to know each other. The new employees learned much about the history, the structure and the values of Messer as a family business. At the end, each employee received his or her personal protective equipment, a Messer backpack and a T-shirt sporting our Employer Branding statement: "That's Messer. That's our way."

## Cooperation in the network

Working together to find the best solution is a typical approach for Messer. Many employees have met for network meetings in the past year precisely with this objective in mind. These meetings – held throughout Europe – have helped our colleagues deal with the technical, strategic and logistical challenges facing them. They also ensured that all the participants got to know each other even better.



Visible success: the employee picnic at Messer Hungarogáz

### China: Management conference

The Management Meeting of Messer China took place in the southern Chinese city of Shenzhen on 9 March 2017. Over 100 executives from 25 Messer companies in China took part in the meeting. As in previous meetings, all the participants were involved in assessing past performance and events as well as looking at the company's future. They also had the opportunity to share and exchange experience and best practice as well as discuss problems and look for possible solutions. A special feature of this year's meeting was the contribution made by an external consultant, who presented a tool for identifying and assessing behaviour patterns. It is designed to help get a better understanding of employees' fundamental attitudes and show ways in which different personalities can work well together in a team.

### Croatia: Meeting of filling plant managers

Led by Alexander Kriese, Vice President Filling Plants/Cylinder Technology, more than 40 participants from all of Messer's European subsidiaries had the opportunity to share their experiences and exchange views. One of the main topics was "optimising the cylinder stock" at our own plants as well as those of our partners. In particular, the role of available IT tools and key performance indicators was discussed. In a workshop, the participants looked at possible ways of improving our pallets, which led to more than 20 concrete proposals.

### Belgium: Chemistry/Environment network meeting

The network meeting for Application Technology Chemistry/Environment took place in Belgium from 17 to 19 May 2017. Colleagues from 14 countries presented and discussed the latest customer projects and developments in chemical, paper and water applications. Furthermore, they shared their experience of day-to-day business at the national subsidiaries.



The executives from 25 Messer companies in China took part in this year's management conference.



A visit to a customer in the chemical industry provided an opportunity to get first-hand experience of a successful example of “cross-selling”: the customer uses gases and hardware from Messer for a number of applications. The latest one to be added is neutralisation with CO<sub>2</sub>.

### **Spain: International communication meeting**

In May 2017, the Messer World’s communications managers (ComManagers) visited Messer Ibérica in Spain. A total of 32 ComManagers from 20 countries devoted their attention to topics such as social media and crisis communication.



ComMeeting in Spain

### **Austria: Experts exchange helium know-how**

In February 2017, Corporate Logistics and Central Sales Functions organised a meeting of international experts for the purpose of exchanging helium know-how and best practice. The technical managers who deal with helium filling at all the Messer national subsidiaries took part in the event. The plan is to hold the event on a recurring basis at other plants and in other countries as well so as to work together to find best-practice solutions.

### **Croatia: Meeting of the CO<sub>2</sub> plant managers**

In mid-May 2017, all 30 of Messer Group’s CO<sub>2</sub> plant managers met in Zagreb, Croatia – including the plant managers of the three new CO<sub>2</sub> plants in China. The plant managers’ meeting takes place every eighteen months and provides an ideal platform for exchanging experience and discussing operational as well as technical issues. A tour of the CO<sub>2</sub> plant in Kutina was also on the agenda.

### **Vietnam: Know-how transfer**

In July 2017, Tony Low and Martin Zeller of Messer Cutting Systems (MCS) led five days of training for the Messer Haiphong and Messer Vietnam sales and engineering teams. The training focused on oxyfuel technology. Over and above that, our colleagues provided training to various Messer customers in Vietnam in the safe, secure and efficient use and handling of our oxyfuel and GFILAM products such as line or ring burners with automatic flame monitoring. This know-how transfer and our future range of special and complete solutions will also help us win new customers in Vietnam.



Martin Zeller (2nd from left) and Tony Low (3rd from left) of Messer Cutting Systems as well as Vu Thi Mai (right) of Messer Haiphong talking to the maintenance manager (left) at Nui Phao Mining in Thai Nguyen.



Food Network Meeting in Poland 2017

### Poland: "Food" Network

This year's Messer Group "Food" Network Meeting was held in Cracow at the end of September 2017. The meeting focused on cooling and freezing applications. One of the highlights of the event was the workshops: theoretical calculations were first performed in groups before validating them in practical tests.

## Digital learning platforms

### Own eLearning platform at Messer

Messer Group invites all of its national subsidiaries to use the company's own web-based eLearning platform. The user interface of this tool is available in more than 20 languages. At no additional user-license cost, online training courses can be organised and carried out with externally purchased and own training content. An eLearning template is available for this purpose. A team consisting of employees from the corporate areas of Human Resources, Legal, Medical as well as IT/Data Protection launched this project in 2015. The test run conducted in 2016 of a self-produced online training course on antitrust and competition law was a success. The Messer Group's eLearning platform was used in 2017 for a brief online

training course in the Messer companies on pharmacovigilance in the area of CSF Medical, Pharma and Food Gases.

### China: Learning via live stream

Messer China is using the "WeChat" social app to provide flexible and cost-effective training to its employees: internal live-stream lessons are used for training and practice in the presentation of sales, application and engineering topics.

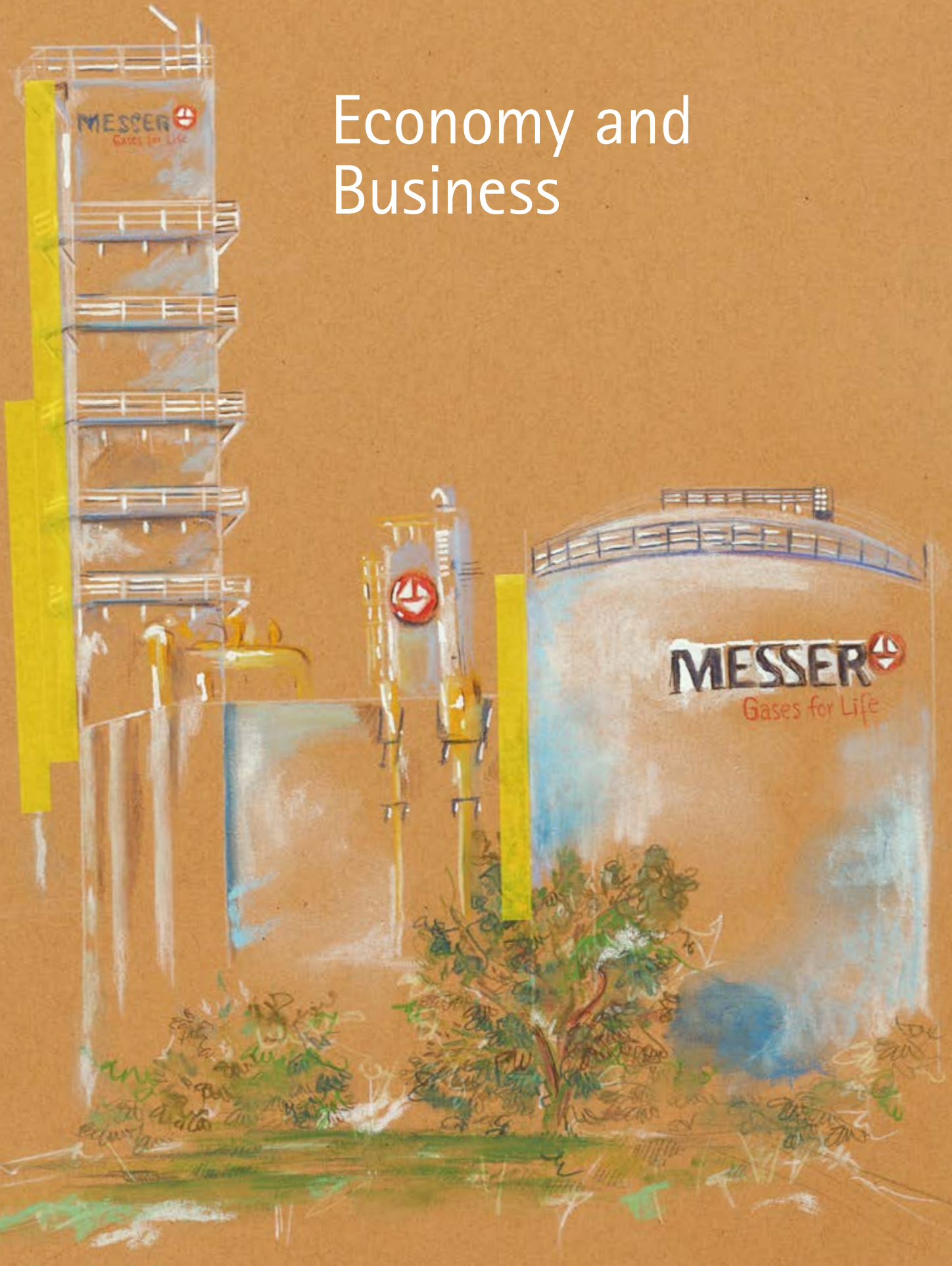
Employees can take part in the lessons wherever they are via their smartphone. And it is not a problem if someone misses a course because all the lessons are recorded.



Grace Zhang, HR Manager at Messer China, moderates the internal live-stream course.



# Economy and Business







# Economy and business

## Reliable Product Supply Through Investment

The industrial gases market is more hotly contested than ever before. To be able to respond even better to changing market conditions and customer requirements, we must continue to grow worldwide. The basis for this is provided through the investment projects implemented in 2017. More information on investment is provided by the Messer Group's Group Management Report 2017.

### **China: Messer continues to invest in Hunan, China**

In May 2017, Messer signed an agreement with the Changsha Hi-Tech Zone in the South China province of Changsha for the construc-

tion of a production plant for air gases. The plant will be built directly next to the existing bottling plant for cylinder gases and will go into operation in the autumn of this year. It will produce 520 tonnes of liquid air gases per day. Messer is investing around 33 million euros in the production of oxygen, nitrogen, argon and other technical gases for production plants in the Changsha Hi-Tech Zone and surrounding areas. Messer is a pioneer in the market for industrial gases in Hunan and has already invested in a total of nine air separation units with a total capacity of more than 200,000 cubic metres of oxygen and nitrogen per hour. This makes Messer the largest supplier in this important regional market.



Messer is a pioneer in the market for industrial gases in Hunan and has already invested in nine air separation units.



Prepared CO<sub>2</sub> is stored in special tanks. Customers are the food, beverage and chemical industries or agriculture.

### China: Messer becomes the largest supplier of CO<sub>2</sub>

In March 2017, Messer started operation of the world's largest of its CO<sub>2</sub> recovery plants in Nanjing, China, making Messer the leading provider of recycled CO<sub>2</sub> in China. The system has a capacity of 150 thousand tonnes per year and meets the highest standards of quality and energy efficiency. The gas can be used in the food industry, such as carbon dioxide for beverages. Alongside Nanjing, in 2014 Messer commissioned a plant in Yunnan, and another in Sichuan in 2015. Messer now recovers a total of 300 thousand tonnes of CO<sub>2</sub> per year from industrial processes in China.

Many industrial processes give off CO<sub>2</sub>. Recovery plants extract the gas before it escapes, thereafter cleaning it in several stages to make it ready for reuse. Customers of the expanding food and beverage industry, chemicals and agriculture and environmental engineering will be served by the plant in Nanjing.

In addition to the CO<sub>2</sub> recovery plant, Messer is commissioning a new technology centre for

gas application technologies in Nanjing. Here, with the support and expertise of our international experts, application technologies will develop tailor-made solutions for the Chinese market.

### China: Largest air separator in Messer history

Guided by its main strategy of business diversification, in China Messer is focusing on developing its business for bulk, cylinder and special gases. In Dong Guan, in the southern Chinese province of Guangdong, Messer is investing in the largest liquid production plant for air gases that Messer has ever built. As a result, from 2020, we can supply the entire Pearl River Delta – a major economic centre in southern China – with industrial gases at competitive conditions. Parallel to the expansion of this sales area, we will double our capacities for liquefied gases at the Shunde location in Guangdong by investing in a second new air separation unit from 2019.

### **China: Development in the Special Gases area**

The development of the Special Gases area in China is promising. Ever since the first plant for electronic gases went into operation in Suzhou in 2014, the revenue generated by  $N_2O$  and the image of Messer have developed very well. As the limits of production capacity have since been reached, and demand for the electronic gas  $N_2O$  continues to climb, in late 2017 it was decided that the existing  $N_2O$  plant would be extended. Above and beyond this, another  $N_2O$  plant is set to open in the western Chinese province of Sichuan, which will make Messer one of the largest suppliers of  $N_2O$  in China by the end of 2019.

### **China: First automated filling unit and new filling plant**

The first automated filling unit installed by Messer will be commissioned in Changsha in

the first half of 2018. This is a reference project for Messer and sets standards for further filling plants in China. We expect this to result in significant improvements in terms of the efficiency and safety of cylinder-gas filling. In addition, in January 2018, a new cylinder-gas filling facility was opened in Sanshui in Guangdong province. This location will also assume the role of Messer's centre for special gases in southern China.

### **Vietnam: Messer is building three new plants for the production of industrial gases**

Messer and Hoa Phat Steel, the largest steel producer in Vietnam, signed a contract in Hanoi on 17 April 2017 for the construction of two production plants for industrial gases. The agreement carries a term of 25 years. Messer will supply the steelworks with the air gases oxygen, nitrogen and argon via pipeline. In November 2018, the first of the two plants is due to be commissioned in the Dung Quat Economic Zone in south-central Vietnam. The total





capacity will be 80,000 normal cubic metres of oxygen and 160,000 normal cubic metres of nitrogen per hour, equating to about five and ten tankers, respectively. It will therefore be the biggest plant for the production of industrial gases in Vietnam. Messer is investing a total of over 90 million US dollars.

In addition to supplying the steelworks, Messer is also supplying the local market, such as the shipbuilding industry and automotive suppliers, with gases in liquid form. Messer has had a cooperation arrangement with the Hoa Phat Group since 2007. At that time, Messer invested 20 million dollars for construction of an air separation plant to meet the gas requirement of the first integrated steel plant of Hoa Phat Steel. The second plant was commissioned in 2012 and increased Messer's production capacity in Vietnam by around 150%. Messer commissioned its third air separation plant in Vietnam in 2016.

With a capacity of 27,000 normal cubic metres of oxygen and 54,000 normal cubic metres of nitrogen per hour, this was the largest industrial gas plant in the north of Vietnam. In late 2017, Messer and Hoa Phat agreed to build another plant that will complement the three existing plants in early 2019. This will increase the current production capacity at the location in Hai Duong by an additional 50%. These additional amounts are intended not only for the supply of the steel plant, but will also ensure Messer's position as a leading provider of liquefied gases in the north of Vietnam.

#### **Malaysia: New joint venture**

Messer and the Malaysian company Universal Industrial Gases (UIG) signed a joint venture agreement in 2017. Messer owns more than 60% of the shares. UIG was founded in 2009. In October 2016, the company commissioned its second bottling plant for gases in cylinders in the province of Selangor. We anticipate high growth in the ASEAN countries over the long term. The joint venture UIG invests in new gas cylinders and further optimisation of safety

and quality assurance. In addition, the product portfolio is being expanded. These measures aim to ensure competitiveness in the growing market in Malaysia. The two UIG sites – at Semenyih, south of Kuala Lumpur in the province of Selangor, and at Senai, in the southern province of Johor Bahru – employ a total of 50 staff. Both plants are cylinder filling plants for industrial gases. In Senai, UIG also operates an acetylene plant. Messer also managed secure entry into other, fast-growing ASEAN countries such as Thailand and Indonesia, where Messer distributorships have already been established. We manage business development from Singapore and are creating a contiguous network of business activities extending from Indonesia to Singapore, Malaysia and Thailand.

#### **Bulgaria: Own CO<sub>2</sub> production in Katunitza**

During the fourth quarter of 2017, Messer Bulgaria commissioned a plant for the production of carbon dioxide in Katunitza, near Plovdiv. The raw gas required for CO<sub>2</sub> production is generated during ethanol production. The good geographical location of our new plant in the centre of Bulgaria optimises transport costs and permits faster delivery to our customers.

#### **Bosnia-Herzegovina: New CO<sub>2</sub> plant**

Messer BH Gas built a second CO<sub>2</sub> unit in the plant in Sockvac in September 2017. The aim of this development of existing capacities is to promote further expansion in the market. Both plants are certified according to HACCP and ISO/FSSC 22000 and have received approvals from Coca-Cola and PepsiCo. In Banja Luka, a new distribution centre for cylinder gases – one of the most modern in Bosnia – has been built to provide customers with an improved comprehensive supply. In Sarajevo, we have started offering modern services covering every aspect of our cylinder gases.

**Poland: Partial acquisition of a gas-trading company**

Messer has acquired portions of the owner-operated company Roman Kowalski Trans-Mat-Gaz ("TMG") with headquarters in Warsaw, Poland. The business activities of TMG, which generated revenue of some PLN 8.5 million in 2016 (approximately 2.0 million euros), centre around the sale of liquid oxygen, liquid nitrogen, liquid argon and hydrogen in battery-operated vehicles with a regional focus on the greater Warsaw area.

**Hungary: Strategic growth**

Messer Hungarogáz operates its own production facility on the premises of MOL Petrolkemia in Tiszaújváros. An air separation unit has now been added to the existing on-site facilities. This was done to meet the increased demand for gases from Hungarian customers and to improve operational reliability. The new unit has been producing oxygen and nitrogen since July 2017. This investment represents a significant step towards achieving our strategic objectives in that it ensures our independence in terms of production and supply capacities, increases our market share and boosts our competitiveness.

**Hungary: Expansion of the Ölbő unit**

Since 1995, Messer Széndioxid has operated a CO<sub>2</sub> plant in Ölbő, in the west of Hungary, where carbon dioxide is reclaimed. The carbon dioxide field there is the second largest in Hungary. Due to high demand, in 2017 we managed to double our production capacity by expanding the CO<sub>2</sub> site. A renewed increase in demand for liquefied gas has now required investment in a third CO<sub>2</sub> production plant, which will go into operation in 2018: this will actually triple our production volumes. Our high-purity CO<sub>2</sub> meets the highest quality requirements of the food and beverage industry.

**Slovenia: First Messer air separator**

Messer Slovenija built the first air separation unit of its own in Slovenia in 2017, with Messer investing some 17 million euros. It is located in the Trata industrial park in Skofja Loka and thus in the immediate vicinity of the production plant operated by insulation manufacturer Knauf, which we supply with oxygen from our new plant via pipeline. With the new production facility, we are intensifying our business relationships and at the same time strengthening our position



on the Slovenian market, because we can guarantee greater security of supply and fast delivery times.

## Quality assurance for our products, processes and infrastructure

### Poland: Introduction of BABEL

Messer Polska introduced the BABEL cylinder-tracking system in December 2017. Here, each rental container is provided with an individual bar code that is read into the system with every movement of a cylinder, thus permitting real-time tracking of the container. This is how we are making complex logistical processes more transparent and reliable.

### Switzerland: New office building

Messer Schweiz continues its focus on the location in Lenzburg. A new office building with 16 new offices for 27 employees was

completed in December 2017. The building also houses three conference rooms and a recreation room.

### Netherlands: Location in Moerdijk getting in shape.

Our filling plant for industrial gases in Moerdijk was built in 1992 by the former Messer Griesheim GmbH. The technology in use there has since grown outdated. This is why, in November 2015, Messer decided to replace the entire filling plant, over two project segments, with a modern installation featuring automated filling processes. It was commissioned in July 2017. Among other things, this modernisation provided greater safety, more ergonomic working conditions, simpler handling for the operator and more precise gas mixtures thanks to the mechanical filling process.

### Slovakia: Certification provides edge

In April 2017, Messer Tatragas became the first manufacturer of food-grade gases in Slovakia to receive FSSC 22000 certification. This certification provides confirmation of compliance with internationally recognised food industry standards. In this way, we increase our customers' trust in us and improve our prospects in the market.

### France: Joint venture extended

Since 1992, Air Products has operated an air separation unit in Beauvais as an equal shareholder in the "Soprogaz" joint venture with Messer France. Last year, the term of the joint venture was extended until December 2029. According to the new terms, Messer France is the operator of the air separator with effect from 1 June 2017.





When it comes to clinical treatment, medical gases are an important component for health. They are also used in cryotherapy, in the storage of biological materials and in many other areas.

**Bosnia-Herzegovina: Messer BH Gas is approved CO<sub>2</sub> supplier to Coca-Cola**

Messer BH Gas is an approved exclusive supplier of carbon dioxide for Coca-Cola in Bosnia-Herzegovina. In early November 2017, during a two-day audit, Messer BH Gas succeeded in demonstrating that its two CO<sub>2</sub> production lines conform with the high standards of The Coca-Cola Company. This includes the raw gas quality, a detailed production sequence, first-class process monitoring as well as regular analysis of raw gas parameters and an analysis of the end product by an independent laboratory recognised by The Coca-Cola Company.

**Serbia: Messer Tehnogas gains renewed approval for medical gases**

On 13 October 2017, Messer Tehnogas, Serbia, received its renewed marketing authorisation for medical gases. Before that, the company had to renew its licences for the production of medical gases at its five

production sites. Both measures were completed within an unusually short time frame. After obtaining the manufacturing licences and successfully carrying out GMP certification, the marketing authorisation renewal process only took a few weeks – instead of the usual six months – thanks to good cooperation with the Serbian Medicines Agency. In addition, Messer Tehnogas had previously succeeded in bringing about a change to the rules and regulations that apply to the production of medical gases: it is now no longer necessary to employ a correspondingly specialised pharmacist as the manager of a medical gases filling plant. As in other European countries, medical gases filling operations can now be managed by non-pharmacists in Serbia too. At Messer Tehnogas, they tend to be mechanical engineers with a degree and an appropriate level of experience, thereby fulfilling the more flexible requirements which, besides pharmacy, now also permit academic qualifications in



mechanical engineering, technology, chemistry and five years of relevant professional experience.

### **Slovakia: Messer Tatragas puts modernised testing facility into operation**

At the beginning of March 2017, Messer Tatragas put its modernised steel cylinder testing facility in Šal'a into operation. A new conveyor chain for automated blasting, spray painting and drying has been installed, facilitating highly efficient processing of the steel cylinders. Furthermore, an ultrasound testing unit is now being used in addition to the existing hydraulic testing facility. The entire project took 14 months to complete, during which the testing of steel cylinders continued without interruption. With the granting of the operating licence, all the new facilities have now been put into operation.

Up to 100,000 cylinders from Poland, Hungary,

the Czech Republic and Slovakia will be tested in a two-shift operation. To this end, eight new employees have been taken on.

## **Documented Supply Chain**

G4-12

Messer maintains a long-standing relationship with its suppliers. Within the corporate areas, the purchasing of logistics services, commodities, merchandise, machinery and containers throughout Europe is centrally organised. For these products, Messer works with long-standing suppliers who are regularly audited. Before concluding a contract with a new supplier, the supplier is first subjected to a comprehensive audit.

When selecting suppliers, the Messer Group makes sustainable behaviour a prerequisite; it also observes the principles anchored in the UN Global Compact.



Up to 100,000 cylinders are tested at the modernised testing facility in Šal'a. Fótyi Dezider and Frantisek Tóth of Messer review the data with the aid of the BABEL system for cylinder tracking.



The Engineering & Production Department at the Messer Group has been successfully certified in accordance with ISO 9001 since 2013. The Corporate Production Department supports the national subsidiaries with the operation and maintenance of existing production facilities (troubleshooting, maintenance planning, expertise transfer/training, standardisations).

The Engineering Department is responsible for all technical and procurement-related aspects in connection with execution of projects for the production of all manner of gases. These include the development and the safe and quality-compliant construction or conversion of units for the production of technical and medical gases. In addition to plant design, project management and construction management, these tasks also include procurement/purchasing of all necessary plant components and continue through to commissioning. Because many components meet customer-specific requirements, the department has a large number of suppliers with which the Messer Group maintains long-term supply relationships. Extensive supplier audits are performed each year within the scope of certification under ISO 9001.

The Logistics, Sourcing and Filling Plants Department (SCM) ensures the availability of products for the Messer Group. It is responsible for the development and construction of transport equipment. Standards are defined to achieve a maximum level of effectiveness and safety. Logistics services essentially entail the procurement of transport services. External carriers transport bulk and cylinder products. These carriers use Messer transport equipment for the transport of gases. Agreements in place with the transport companies are subject to annual review. In this regard, the Messer Group attaches great importance to compliance with safety

standards, reducing diesel consumption and continuously improving emissions behaviour.

The purchase of energy for the consumption of electricity by the air separation units falls under the generic term of "Commodities" and is also organised centrally by SCM. Long-term agreements with renowned energy suppliers secure the use of electricity. Customers' supplies of products are ensured through long-term agreements with suppliers of gas and raw materials.

Messer GasPack supports and advises Messer's national subsidiaries on all matters relating to high-pressure vessels, tanks and evaporators. This includes technical design, approvals and legal aspects, as well as maintenance, testing and handling of the equipment.

Technical standards are defined that are relevant, inter alia, to the procurement of the assets by Messer GasPack.

GasPack is also responsible for the development, construction and conversion of filling plants and the associated equipment in cooperation with the national subsidiaries.

SCM and GasPack conduct supplier audits based on a standardised procedure. In audits of suppliers, attention is paid to implementation of a quality-management system and, inter alia, other aspects relative to quality, safety, sustainability and environmental protection. Each supplier receives and is notified of the assessment it has received as a result of the audit. If an assessment is unsatisfactory, the supplier does not receive authorisation.

## Birthdays of our companies

### Germany: Messer Industriegase GmbH is ten years old

On 12 May 2017, Messer Industriegase celebrated its tenth birthday in the location in Germany and hence its successful re-entry to the German market in 2007. Highlights in recent years have been the construction of the air separation units in Siegen and Salzgitter as well as the expansion of the cylinder gases filling plant in Siegen.

### Vietnam and Bosnia-Herzegovina: Twentieth anniversary

In 2017, the Messer entities in Vietnam and Bosnia-Herzegovina celebrated their 20th anniversaries.

### Slovenia: Two birthdays

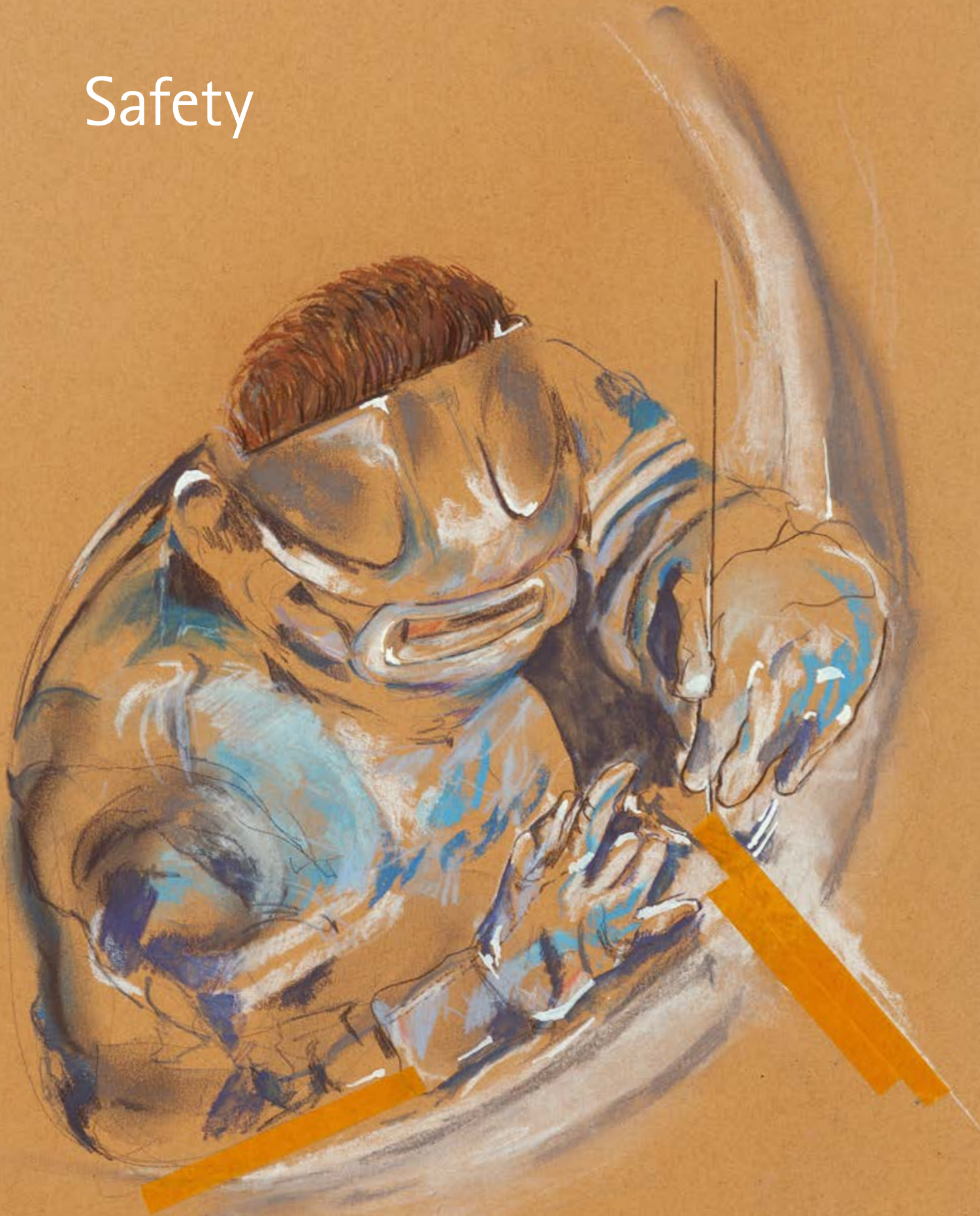
Messer in Slovenia celebrated two birthdays: Messer Slovenija has been the country's market leader in industrial gases for 25 years. The plant in Crnuce has been producing acetylene for 50 years.



Messer in Vietnam celebrated its birthday with a glittering ball – with music, dance and lots of guests. Host Marc Wachter (4th from left) addressed the audience from the stage and thanked all his companions.



# Safety









G4-DMA  
Consumer health  
and safety

# Safety

Safety – both for us and our customers – when handling our gases, safety in the workplace, be it on the shop floor or in the office, plant safety as well as safe logistics and vehicles – all these elements are of fundamental importance to our customers, partners and employees. This is clearly reflected in our materiality matrix. Health and safety at work are firmly established in our company as well as our industry as a fundamental element. In our mission statement, our internal guidelines and our organisational approach, safety is a central feature for all business units, thereby enabling our experts to implement individual measures aimed at constant improvement. The topic of workplace safety also accounts for a full section in the Messer Group Management Report where additional information can also be found. Overall, the safety figures at Messer have shown clear improvement in nearly all areas. Unfortunately, there was a death in the workforce this year.

## Safety of our employees

The number of industrial accidents reported with loss of working hours fell sharply from 25 (2016) to 15 in 2017. The rate of loss of employee working time per million hours worked (accident frequency rate) fell by 1 to 1.4.

The number of employee working days lost (industrial accident severity rate) per million hours worked also fell in 2017, from 77.9 to 45.4. In 2017, there were 37 reportable industrial accidents, compared to 88 the previous year. The frequency rate of reportable industrial accidents per million hours worked decreased from 8.3 to 3.5. Unfortunately, the number of deaths rose from 0 in 2016 to 1 in 2017: while inspecting painting work on a storage tank, an employee fell from a scaffold and succumbed to his injuries.

G4-DMA  
Occupational health  
and safety G4-LA6

**Messer Group Safety Campaign 2017:  
We want you ... safe and healthy!**

The Messer Group had once again set itself the goal of improving its key performance indicators in the area of occupational safety in 2017. All of the safety measures are accompanied by a new poster campaign which was announced for early 2017 on Safety Day 2016: under the slogan "We want you... safe and healthy!", the Management of Messer Group and the Managing Directors of the Group's companies are making a personal appeal to their employees to comply with the safety guidelines. To this end, portrait photos were taken of all the Messer Group's senior executives during a photo shoot at the 2016

Company Conference in Romania.

The new campaign was also presented as part of internal safety training.

**Safety Day at all locations**

On 8 September 2017, the Messer Group held its annual international Safety Day. The main topics this year were personal responsibility and raising awareness of potential hazards. A basic rule was underlined in this regard: all employees should take responsibility for their own actions, their own situations and their own decisions – and in cases of uncertainty, they should ask someone. The Safety Day also provided the ideal platform to broach the subject of terrorism, which



**We want you ...  
safe and healthy!**

 Understand and search for potential asphyxiation hazards, in enclosed spaces as well as near to equipment containing gases or cryogenic liquids ... take care and warn others.

**MESSER**   
Gases for Life



**We want you ...  
safe and healthy!**

 EIGA believes that workers should take responsibility for their own actions, condition and decisions... whenever they feel unsafe they should speak up.

**MESSER**   
Gases for Life

poses a threat to businesses like Messer as much as it does to any other members of society. It is important to the company to sensitize its employees to conspicuous and correct behaviour.

Messer has also been heightening its employees' awareness of topics in the field of environmental protection since 2013 with its annual Health and Safety Day.

### **EIGA Safety Awards**

Messer received 15 Safety Awards for exemplary work safety from the European Industrial Gases Association (EIGA) on the occasion of its Summer Session 2017, which was held in Manchester, England, at the beginning of June:

Messer Tatragas (Slovakia) received the "Gold Two Star Safety Award" for 25 years of accident-free operations. The Messer Technogas filling plant in Kladno (Czech Republic), the Messer Vardar Tehnogas site in Skopje (Macedonia) and Messer Mostar Plin (Bosnia-Herzegovina) were each honoured with an EIGA Award in the "Gold Star" category for zero industrial accidents in 20 years. OOO Elme Messer K (Kaliningrad), Messer Energo Gaz (Romania), Messer France's Gondecourt site (France) as well as the Messer Ibérica de Gases site in Tarragona (Spain) and UAB Elme Messer's Vilnius site (Lithuania) were each awarded a Gold EIGA Safety Award for 15 years without industrial accidents.

The Messer Croatia Plin site at Kutina (Croatia) and Messer Slovnaft (Slovakia) each received a Silver Safety Award for ten years without accidents.

A further Silver Award went to Messer Croatia Plin (Croatia) for 500,000 accident-free man-hours at its Zapresic plant.

In the "Bronze" category, the Messer Tehnogas site at Bor (Serbia), Messer Polska's Kędzierzyn-Koźle site (Poland) and Messer Industriegase (Germany) were each honoured for five years with zero industrial accidents.

To further strengthen our safety campaign, the Management of Messer Group thanked the responsible employees of the named national subsidiaries companies for their outstanding service in the context of a formal event. The EIGA Safety Awards were presented at the event by Danilo Ritlop, Senior Vice President SHEQ, together with the member of Management in charge for the respective region.

### **Switzerland: Fire brigade drill**

The exercise held on 18 May 2017 at the site of Messer Schweiz in Lenzburg had two main areas of emphasis: the visit to the new liquid oxygen filling facility was particularly useful for this. Firstly it served to update the fire brigade's knowledge of the site and danger spots, the visit to the new filling building for liquid oxygen. Secondly, a fire was simulated at the filling facility for hydrogen trailers. For this purpose, the fire brigade used a water wall (hydroshield), which, in the event of emergency, keeps a fire from spreading while simultaneously cooling the hydrogen trailer. This was also an opportunity to test the plant's own water network to check if it is fit for use in an emergency.

G4-PR1

## Safety of our customers

In 2017, we operated 8,808 facilities of our own at our customers' sites. In the Sustainability Report 2016 by Messer Group, a calculation error wrongly identified 7,705 own facilities for the financial year. The correct figure is that we operated a total of 8,390 facilities of our own at our customers' sites. Accordingly, the number for 2017 was 418 higher. These facilities underwent a total of 9,171 technical tests. In total, Messer carried out 1,582 safety audits on its own facilities at customers' sites; this figure is 283 higher than in the previous year. Messer conducted 1,590 safety training events at customer sites, which were attended by a total of 4,716 participants.

## Poster for colour-coding of cylinders

G4-PR3

Identifying key hazard characteristics of industrial and medical gases in cylinders at a glance: A poster issued in 2017 lists the colour codes that Messer uses on the basis of the EN 1089-3 standard. This makes it possible to tell from a distance whether, for example, a gas is toxic, flammable or oxidising. In addition, the hazardous material labels contain further information on the properties of each gas. The poster is sent to interested parties free of charge.

## Messer warns against silent death by carbon dioxide poisoning

With safety posters available to order free of charge, Messer drew attention to "silent death" due to increased concentrations of CO<sub>2</sub>. Carbon dioxide is heavier than air, and at elevated concentrations it acts as an asphyxiant by causing oxygen depletion.

**MESSER**  
Gases for Life

# The silent killer: carbon dioxide intoxication.

**1. Carbon dioxide intoxication**

Carbon dioxide is heavier than air, and at elevated concentrations it acts as an asphyxiant by causing oxygen depletion. However, it is not just a simple asphyxiant – like inert gases – but also has acute systemic effects entirely independent of the oxygen concentration.

If the concentration of carbon dioxide in the ambient air increases, the pulmonary gas exchange in human lungs is compromised, leading to an increase in the concentration of carbon dioxide in the blood and tissues. This kind of intoxication is something the human body is extremely sensitive to.

**2. Confined space**

An example: the ambient air in a vessel (confined space) consists of more than 18% oxygen and more than 10% carbon dioxide.

This means: even if there is enough oxygen in the vessel's ambient air to support life, humans can't survive in an atmosphere with more than 10% CO<sub>2</sub>.

**Never enter a confined space or vessel without a work permit or without carrying out a risk analysis. There might be carbon dioxide present, in which case breathing apparatus must be used.**

**3. Effects of inhaling carbon dioxide**

**1–1.5% CO<sub>2</sub> in the ambient air:**  
Slight effect on chemical metabolism after exposure of several hours.

**3% CO<sub>2</sub> in the ambient air:**  
The gas is weakly narcotic at this level, giving rise to deeper and more rapid breathing, reduced hearing ability, coupled with headache and an increase in blood pressure and pulse rate.

**4–5% CO<sub>2</sub> in the ambient air:**  
Danger and more rapid breathing as a result of the stimulation of the respiratory centre. Signs of intoxication will become evident after 30 minutes of exposure.

**8–10% CO<sub>2</sub> in the ambient air:**  
Breathing becomes laboured, with headache and loss of judgement.

**10–100% CO<sub>2</sub> in the ambient air:**  
Unconsciousness occurs in under one minute and unless prompt action is taken, further exposure results in death.





Emergency training at Ajka Crystal, a customer in Hungary

But CO<sub>2</sub> also has acute systemic effects on the body that are not related to oxygen concentration. If the carbon dioxide concentration in ambient air rises, the natural gas exchange in the human lungs no longer works correctly, and a lethal carbon dioxide poisoning can result.

#### **Safety information on paper and online**

More service and safety for users of gases in cylinders: Messer provided four pocket guides on safe handling and transport of gases for its customers. These are also available as web-tutorials on Messer's YouTube channel.

#### **Hungary: Rehearsing for the real thing**

On 3 October 2017, Messer Hungarogáz took part in an emergency exercise at the premises of Ajka Crystal, a Messer customer in the Hungarian town of Ajka. As per the training plan, this involved simulating

the kind of accident that could happen with liquid oxygen when filling a pressure vessel. A sudden escape of the cryogenic oxygen can result in those involved in the accident suffering cold burns. An Ajka Crystal first-aid-er attended to a suitably prepared exercise 'victim', while the professional fire brigade were called out to deal with the fire-fighting.

## **Safety of our logistics and vehicles**

The relevant key performance indicators regarding the "safety of our logistics" show a very positive trend. The number of avoidable accidents in connection with the transportation of gas cylinders fell sharply from 12 in 2016 to 4 in 2017. Per million kilometres driven, this signifies a decrease from 0.48 to 0.17.

G4-DMA  
Transport,  
G4-EN30

The number of avoidable accidents in connection with the transportation of liquid gases also fell sharply.

In 2016, there were 31 accidents, while in 2017 that figure fell to 13. Per million kilometres driven, this signifies a decrease in frequency from 0.49 to 0.15.

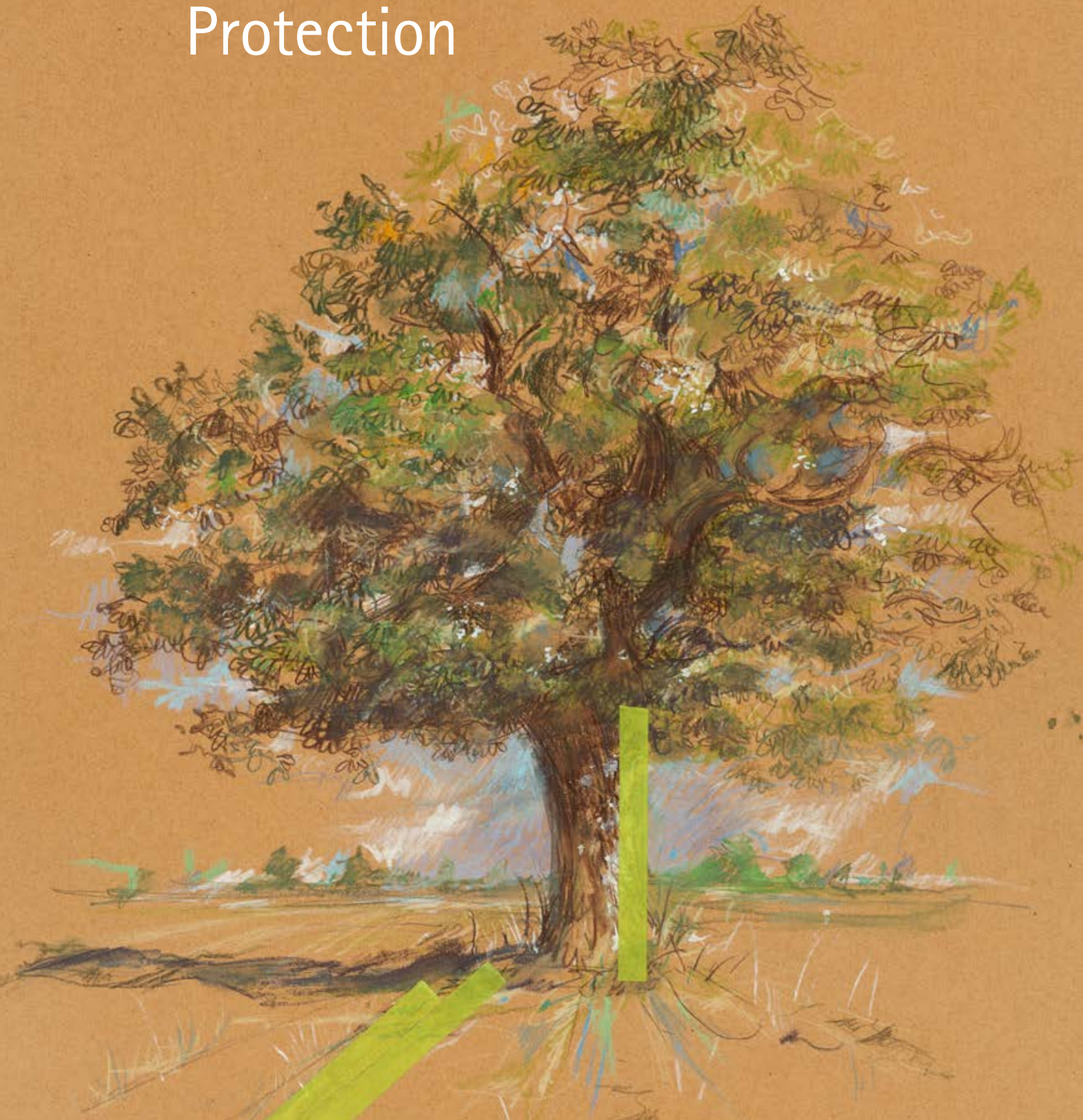
In addition to the statutory provisions on operating a vehicle fleet, Messer also implements its own safety concept for the transport of gases with tankers and cylinder trailers. The driver training prescribed as per ADR (European Agreement Concerning the Carriage of Dangerous Goods by Road) is thus supplemented by our own modular driver training programme. You can read about further measures in the area of transport safety in Messer Group's 2017 Management Report.

#### **Slovenia: Driver training for increased safety**

Safety has right of way at Messer. Accordingly, 41 Messer Slovenija colleagues from the sales, application technology, maintenance, SHEQ and management teams took part in a driving safety project organised by the Slovenian Chamber of Commerce. The project was carried out in the most modern training centre in Slovenia, the "AMZS Driving Safety Centre" in Vransko. The facility spans 15 hectares, or approximately the size of nine football pitches. Driving safety training is carried out here under the strictest European directives.



# Environmental and Climate Protection









# Environmental and Climate Protection

G4-DMA Emissions

## Environmental Guidelines

As an integrated policy, our SHEQ (Safety, Health, Environment and Quality) guidelines reflect the Messer Group's commitment to environmental protection. In addition, Messer adheres to a set of general environmental guidelines.

The Messer Group will

- determine the material impact of its business activity on the environment and set itself targets for the continual improvement of its environmental compatibility
- reduce the environmental impact of its products and services
- endeavour to prevent pollution of the environment
- reduce waste generation and support programmes aimed at the prevention of pollution
- provide operating principles, processes, procedures and resources for the implementation of its environmental guidelines, taking into consideration the best available technology
- encourage its staff to act in an environmentally friendly way, both at work and at home
- promote continuous improvement in waste minimisation
- comply with or exceed the requirements of existing environmental legislation
- carry out environmental impact assessments before building new facilities or modifying existing ones
- strive for open and honest communication with all stakeholders and neighbours

- minimise energy consumption and, wherever possible, reuse materials in an economically viable way

## Environmental Protection through Energy Management

G4-DMA Energy, G4-EN6

The Messer Group's objective is to reduce the specific energy consumption of our air separation units by 0.5% a year from 2010 to 2020. We aim to achieve this through better capacity utilisation of our production facilities, continuous investment in even more efficient facilities and targeted energy efficiency projects. Within the Messer organisation, responsibility for energy management rests with the Global Energy Officer (GEO), a position created in 2014.

Year-over-year, we have reduced the specific energy consumption by 1.7% and are thus clearly ahead of our target.

The Messer Group develops and builds its own air separation units. Energy efficiency is a key aspect in their design. Efficient energy use and cost-effective procurement of energy are also of major importance to the Messer Group. Optimising electricity procurement includes Europe-wide calls for tenders, long-term general agreements and continuous monitoring of the futures and spot markets.

A central electricity procurement unit supports and advises Messer's national subsidiaries on buying electricity and carries out regular checks of their electricity costs



Air separation units exclusively process ambient air for use in the production of industrial gases.

as part of a benchmarking exercise. The use of renewable energy is also checked on a regular basis.

### Greenhouse gas emissions

Air separation units process ambient air without producing any toxic or environmentally harmful emissions.

Even in the event of a shut-down or fault, only air components are emitted. Our products are gases which are delivered either by pipeline, via tankers to fill customer tanks or in cylinders. Only cylinder gases are packaged products. Steel cylinders are usually rented out to customers and returned empty after use. They are therefore 100% reusable after the requisite cleaning and inspection. Our total greenhouse gas emissions are

shown as CO<sub>2</sub> equivalents (CO<sub>2</sub>e). The quantity of emissions is converted into greenhouse gas equivalents using the International Energy Agency's conversion factors. Our calculation of greenhouse gases is broken down into direct emissions (Scope 1) and indirect emissions (Scope 2 and Scope 3), in accordance with the GHG (Greenhouse Gas) Protocol.

Scope 1 includes all direct CO<sub>2</sub> emissions from our production facilities.

Despite efficiency gains, CO<sub>2</sub> emissions are increasing in absolute terms as the number of new production facilities grows. The reduction in specific electrical energy consumption as the biggest factor influencing Messer's CO<sub>2</sub> equivalent can be demonstrated using the energy coefficient. Indirect

G4-EN3, G4-EN5,  
G4-EN7, G4-EN16,  
G4-EN17,  
G4-EN19

CO<sub>2</sub> emissions represent the generation of purchased electricity (Scope 2).

A total of 4,864.6 GWh of electricity was used to operate our production facilities and filling plants. In 2016, the figure was 4,432.7 GWh. This is a significant increase, due on the one hand to commissioning of the SKS Hunan air separation unit (plus 81 GWh) and the significantly higher consumption by the other units in China of 288 GWh. In South-Eastern Europe, the increase was 64 GWh, and in Western Europe 3 GWh. Our electricity consumption, and therefore the absolute value of the CO<sub>2</sub>e, increases with each new production facility and with greater capacity utilisation of existing facilities. The CO<sub>2</sub>e for 2016 was 2,817,754 tonnes, compared with 3,151,015 tonnes in 2017 (Scope 2). The energy coefficient fell significantly from 1.368 in 2016 to 1.345 in 2017. This owed to capacity utilisation of the production facilities in China and to increased customer consumption in Europe.

Indirect emissions that come under Scope 3 include all Group-wide emissions that are not covered by Scope 1 or Scope 2. This includes, for example, the electricity needed for administration buildings or used in connection with travel undertaken by employees. Here the CO<sub>2</sub> equivalent for 2017 was 68,359 tonnes compared with 64,772 tonnes in 2016.

All in all, emissions of CO<sub>2</sub>e increased to 3,361,213 tonnes. The CO<sub>2</sub>e coefficient per euro of revenue stood at 2,729 kg in 2017.

G4-EN15

### Fuel consumption and other emissions

Diesel consumption by our bulk and cylinder fleet stood at around 29.6 million litres in 2017. In 2016, the figure was 28.7 litres. In 2017, our fleet travelled 95.7 million kilometres in total, compared to 90.8 million kilometres in 2016. Thus, the average con-

sumption of diesel decreased by 2.2% and went from 0.316 litres per kilometre to 0.309 litres per kilometre.

Messer operates nitrous oxide (N<sub>2</sub>O) production facilities in Croatia, the Czech Republic, Serbia and China. This gas is used in medicine and in the electronics and food industries.

The total CO<sub>2</sub> equivalent for our fleet's fuel consumption and for emissions of N<sub>2</sub>O and hydrogen is 141,839 tonnes of CO<sub>2</sub>e (Scope 1). In 2016, these emissions were 132,981 tonnes of CO<sub>2</sub>e.

### Water consumption

In 2017, total water consumption of our air separation units was 8,001,340 million cubic metres, with most of this being used for cooling the compressors in the air separation units. This represents a reduction of 0.2 million cubic metres.

The two main production processes used at Messer – air separation and CO<sub>2</sub> purification – require no direct addition of water during the process, for example as a solvent. Accordingly, no requirement for process water exists. A large amount of heat is generated during these processes, however, essentially as a result of compression of the media. This heat is usually shunted away by means of a cooling water system.

Most units make use of an open cooling circuit. Here, cooling water is circulated, absorbing the heat from the respective sources and returning it to the atmosphere in an open cooling tower.

A characteristic of the open cooling tower is that a portion of the circulating water evaporates and a further portion is removed in order to prevent thickening of insoluble components, the sludge. The sum of evaporation losses and the amount of sludge must be reintroduced to the system as fresh water.

G4-DMA Effluents  
and waste

This added water accounts for the only water consumed in production processes. The amount of additional water is directly dependent on the power consumption of the unit it serves and stands at around two to three cubic metres per hour per MW of electrical output.

## Certification of energy management systems

Our commitment to environmental protection is also reflected in our Quality Management System, which applies across the Messer Group as a whole. We are ISO 14001-certified in 21 consolidated companies.

In June 2017, the air separation units operated by Messer France at the production sites in Creil and Ugine were audited in accordance with the ISO 50001 standard. Through successful certification, we were able to

provide proof of a well-functioning energy management system. Also in June, Messer France received the new certificate for its production site in Beauvais.

## Energy Saving for our Customers

Our gases also help to make our customers' products and processes more environmentally friendly. In 2017, we carried out 253 new installations of tank systems for our customers, providing them with a supply of our gases for environmentally friendly processes. In the previous year, the number of tank installations was 187.

But the sustainability of processes is also being boosted with the help of our cylinder gases.



For customers with a greater demand for gases, Messer installs stationary tanks that are supplied by means of tankers.



# Customers and Markets





# Customers and Markets

Messer's sales division is geared to the needs of customers. Smaller customers are frequently looked after by local sales partners, while deeper partnerships are developed with medium-sized customers who are looked after personally by our local sales departments. International customers, who tend to have complex needs and requirements that span several countries and an international approach to purchasing and/or production technology, are supported by a Key Account Management Team which operates with international scope. Apart from anything else, this allows us to fully exploit the associated business development potential.

Messer places particular emphasis on gaining customers for cylinder gases. Since 2013, we have actively expanded the cylinder gases segment and increased the level of experience sharing within the Messer Group. Messer sees itself as being closer to customers in this area than its competitors.

In China, the focus continues to be on the liquefied-gas business, although the cylinder business was expanded here as well, particularly in the special-gas sector, especially the sale of nitrous oxide. The sale of liquefied gases is also in focus in Vietnam, particularly in the effort to quickly move to full future capacity utilisation of the planned new air separation unit in Dung Quat. In the effort to further increase growth in Asia in general, an office was opened in Singapore. Business development in Thailand, Indonesia, Malaysia and other ASEAN countries is managed from there.

## Customer satisfaction

G4-PR5

Customer satisfaction is an essential factor in the success of the Messer Group. By measuring customer satisfaction, the services provided can be monitored, and the effectiveness of measures carried out can be assessed. This enables us to continually raise the level of customer satisfaction and improve the long-term commercial success of the Messer Group. In 2017, more than 14,000 Messer customers in the countries were surveyed about their satisfaction with the services received. That represents an increase of 57% over the previous year.

The rate of customers completing the entire questionnaire fell year-over-year (10.9%) to 6.4%. There were exactly 879 customers in all. The number of customers partially completing the questionnaire also fell, from 478 to 447 customers. Messer's overall performance in Europe was given a total rating of 8.49 on a scale of 1 for very dissatisfied to 10 for extremely satisfied. This represents a slight decline compared to the previous year, when the score for satisfaction with general performance was 8.51. The online customer-satisfaction questionnaire comprises between nine and 21 questions. Satisfaction is measured by analysing whether customers are generally satisfied with the services, whether customers see a benefit in being supplied by Messer, and whether they are willing to recommend Messer to others. The focus of the questionnaire is based on the importance of 15 services, with the customers then assessing Messer's performance of these.

The results for overall satisfaction should not be compared with one another, as the men-



tality applied in assessing satisfaction differs from one country to the next. By performing analyses of customer satisfaction on a regular basis, however, we can observe trends in satisfaction within any given country. This is why customer-satisfaction analyses in each national Messer subsidiary should be repeated every two years.

The survey was repeated in the Messer subsidiaries in France, Austria, Bulgaria, Romania, the Netherlands and Slovakia. With the exception of France, where general satisfaction fell slightly from 7.7 to 7.4, general satisfaction in other countries held steady or even improved. French customers viewed availability, the quality of the gases and packaging as very good, but they also saw potential for improvement in the invoice overview and in the punctuality of delivery.

In Austria, where the score was 9.1, the high level of general satisfaction seen in the past was maintained. Very positive marks went to the quality of the gases, the conduct of transport staff and order management, whereas interest in, as well as the assessment of, online services were significantly weaker.

In Bulgaria, too, the customers were very satisfied with the overall service in 2017, giving it the highest rating to date: 9.4. In 2015, the general satisfaction stood at 8.9. The safety standards observed, the quality of the gases and the conduct of employees were viewed in a very positive light. The quality of the data sheets and brochures provided, on the other hand, were deemed areas to be improved.

In Romania, customers' satisfaction level increased from 8.8 to 8.9. Customers took a very positive view of the quality of the gases and the general services provided, but the handling of business with the gases centres was seen to be in need of improvement.

Satisfaction with services in the Netherlands improved slightly as well. The previous survey, conducted in 2014, resulted in a score of 7.7; in 2017, the satisfaction level rose to 8.1. This particular survey was aimed at new customers who had purchased gases with competitors in the past. Satisfaction with delivery times and completeness of delivery held steady and was very positive; the availability of back-office and field sales staff, on the other hand, was viewed as in need of further improvement.

In Slovakia, overall performance was again assessed with a very high level of satisfaction of 8.9, representing further improvement over the 2015 assessment (8.3). The survey asked customers about their satisfaction with order management and transport performance. The result was very positive, particularly where completeness of delivery and availability of the sales office were concerned.

In addition to customer satisfaction, satisfaction of the gases centres was surveyed as well. Gases centres are external companies that sell industrial gases to our customers in our name within defined regions. Cooperation with the gases centres is very important, as it is the gases centres that maintain direct contact with our customers in the regions. For the first time, our survey asked about satisfaction with our cooperation with the gases centres in France.



In Spain, this survey has been conducted for several years. 292 gases centres in all were contacted; 43 filled out the questionnaire in its entirety, and 13 only in part.

The online questionnaire consisted of nine questions. Along with questions around general satisfaction, the survey also asked gases centres to assess the quality of service provided by the various departments at Messer.

In France, general satisfaction of gases centres in this first-ever survey stood at 7.0. Positive ratings were assigned for availability, the frequency of visits and the quality of the gases centres' advisors, as well as the presentation of the driver. Gases centres in France see particular room for improvement in matters of punctuality and completeness of deliveries.

In Spain, the general satisfaction score of 6.6 registered in 2016 increased to 7.6 in 2017. While the quality of gases as well as compliance with safety standards were rated very highly, gases centres there complained of a lack of punctuality and completeness of deliveries, and about the quality of the gas cylinders and valves.

## International key account management

More and more major international corporations and SMEs have begun centrally concentrating and controlling their purchasing organisations. As a rule, a single person or team is then responsible for the purchase processes applied by multiple national subsidiaries. A system such as this calls for a similar structure on the supplier side, with a contact person clarifying and communicating all of the customer's requirements.

International Key Account Management (IKAM) addresses precisely these customer needs. Working in close cooperation with regional sales and the central functions, it develops these customers in line with national strategies.

This task is performed differently, depending on the respective customer case involved. A sales colleague from a national subsidiary who has been designated an "International Key Account Manager" and tasked with expanding business with a key customer with whom he or she is very familiar, is provided with professional and dependable support from IKAM. The business relationship with an international customer, which is directly managed by IKAM, is optimally developed by an international team consisting of sales colleagues in all relevant national subsidiaries, under the supervision of the responsible IKAM.

In addition, IKAM coordinates the international Key Account Team, in which Key Account Managers in the national subsidiaries exchange information, experience and strategies with one another with regard to their common customers, and coordinate their market and customer approach with one another. In the case of contacts with international major customers, IKAM coordinates contract negotiations and calls for tender as needed.

IKAM continues to support sales activities relating to all Messer Group customers with international operations.

## Digital customer service

Messer has developed an array of digital services for customers to facilitate searches for product information, to make customer contact as paperless as possible, and to simplify gas orders.

G4-DMA Product  
and service  
labelling

These eServices are available through our websites, customer portals or apps. These are the services with which Messer would like to make it possible for interested parties and customers to quickly find the right answers to their questions about gases. We offer technical and safety information for products, gas-application information, calculators that estimate the impact of gases on our customers' processes, and general safety instructions.

We also offer our customers administrative services including online updating of their customer profile, the online reordering of gases (E-Order) or the billing portal for paperless invoices (E-Invoice). We also operate an electronic data exchange with major customers.

In some national subsidiaries, such as Serbia or Bulgaria, Messer also offers an online shop.

Other services in the field of gas management include online monitoring of tanks and gas-cylinder bundles (E-Monitoring), and the digital monitoring of cylinders (E-Cylinder Management). For customers purchasing special gases, we offer our own customer portal (myLab), where, among other things, certificates are stored.

## Selected Projects with our Gases in Cylinders

### Switzerland: more and more Triple Savers

Getting existing customers to switch to our ternary mixtures – this was the main focus of the first part of our Triple Saver campaign at Messer Schweiz. We succeeded in further strengthening customer relationships and counteracting any loss of customers to the competition. The second phase focused on gaining new customers. The campaign was supported by our [www.Dreifachsparer.ch](http://www.Dreifachsparer.ch)

website, articles in trade publications and an information brochure. Messer's success rate was greatest when we were able to carry out a demonstration or tests with the ternary mixtures at customer sites.

### France: More cylinder gases for breweries

In April 2017, Messer France launched a nationwide marketing campaign aimed at breweries. Background: The French beer market has grown by 30% since 2010, with further comparable growth expected by 2019.

To share in this growth, Messer has turned to special communication and sales tools, among other things. This includes a specialist brochure and flyers as well as advertisements in trade journals.

Messer's industry-specific range consists of three sales packages which comprise both



The Triple Savers at Bator Industrietore AG: Peter von Mühlenn and Zeljko Zekovic



Precision welding at Merki + Hitz

the CO<sub>2</sub> and the necessary hardware. Success of the sales drive: Our sales colleagues visited 144 breweries in less than three months' time and tapped into considerable business potential.

#### **Czech Republic: Laboratory facility for Škoda**

800 metres of stainless steel piping, 99 withdrawal points and the relevant expansion stations were required for the gas supply systems that Messer installed at Škoda in Mlada Boleslav in 2017. It is part of the new test laboratory that the car manufacturer has built for drive system development and quality control. The system provides the laboratory's test engineers with about 30 different, precisely defined gas mixtures as well as high-purity gases. The laboratory is one of the most modern of its kind in Central Europe.

#### **Switzerland: Everything for sheet metal**

Merki + Hitz AG in Siggenthal processes sheet metal using modern machinery and has its own welding shop and assembly department. There, among other things, it makes complete housings and appliances from sheet metal. The second-generation family business run by Thomas Merki uses numerous manual welding processes, but also has spot and stud welding machines, various press brakes as well as laser and waterjet cutting machines. For cutting and welding, Messer supplies Merki + Hitz with welding argon and Ferroline C6 X1 in cylinders, as well as liquid nitrogen and oxygen from a tank.



The anti-hail gun is being used with the aim of preventing hail damage.

#### **Poland: Hail control gun**

Hail control guns fire a high-energy and high-speed shock wave into the clouds, thereby preventing the formation of hailstones. This is also the functional principle of the anti-hail gun used by the Specjalistyczne Gospodarstwo Ogrodnicze Marek Dzida market garden in Goczałkowice-Zdrój. It protects the company's extensive fields and greenhouses from hailstorms, which are becoming increasingly frequent as a result of climate change. The shock waves are generated by detonating a small amount of the welding gas acetylene in the funnel-shaped gun. The gas for this is supplied by Messer.

#### **Hungary: Repairing ships**

For 171 years, Balatoni Hajözasi Zrt. - the shipping company that operates on Lake Balaton - has been offering its transport services on the Hungarian lake. Among other things, it has 24 excursion vessels and four ferries that link the northern and southern shores of the elongated lake. Last year, the company carried more than 1.7 million

passengers. It also operates the public ports on Lake Balaton. It uses gases from Messer for the upkeep of port facilities and ships. Ferroline and argon are the main gases it uses for welding, and for plasma cutting it uses nitrogen and oxygen. The latter is also used in flame cutting.

#### **Portugal: Welding gases for boiler construction**

Martin Caldeiras, a subsidiary of German waste-to-energy company Martin GmbH für Umwelt- und Energietechnik, produces spare parts for the boilers used in waste incineration plants. At its plant in Caldas da Rainha, which opened in 2017, the firm applies coatings and offers maintenance services. Messer supplies the company with argon, Ferroline and Innoxline for gas-shielded arc welding. The Swiss subsidiary, Martin AG, also gets its welding gases from Messer.



**China: Nitrous oxide for Starbucks**

Starbucks in China uses nitrous oxide from Messer to speed up the process of making whipped cream. Instead of several minutes of stirring, a quick blast of gas is enough to turn the liquid milk product into a fluffy, creamy mass. In addition, the bubbles produced have a flavour-enhancing effect on account of their size. This is why the gas is used frequently in the food industry to froth up liquids and emulsions. For example, the American coffee giant uses it to make coffees such as mocha, con panna and frappuccino particularly creamy. Starbucks operates some 2,600 cafés in China. Messer has specially developed a refillable nitrous oxide pressure cylinder for the company's outlets in Shanghai. Compared with the disposable cans used up to now, it contains 250 times more gas and therefore needs to be replaced much less often.

**Hungary: Nitrogen protects pesticides**

Many liquid pesticides react with oxygen. In order to preclude this unwanted reaction, Farmmix uses nitrogen from Messer in the filling process for such pesticides. The agricultural wholesaler operates its own filling plants at several sites in Hungary. Injecting the gas ensures that atmospheric oxygen is displaced from the containers after filling. Once the full container has been sealed, the inert gas fills the headspace, thereby protecting both the contents and the plastic material against adverse chemical reactions. It also prevents pressure loss in the container, which would occur in the event of an oxygen reaction.



Shelly Zhao (left) and Shally Xia of Messer in China enjoying a frappuccino at Starbucks



Katadyn water treatment systems can fit in a hiker's backpack to offer safe refreshment wherever the trek may lead.

### Romania: Clean water everywhere

'Outdoor' is a megatrend – you get well over two billion hits if you Google this term. People want to get outdoors. And more and more of them want to go where there is no electricity or clean water. Or where it is best not to drink the tap water. The Swiss Katadyn Group specialises in the manufacture of various water purification systems. The larger ones, for example, can be used for the provision of emergency supplies to disaster areas, while the smallest units fit into a trekking rucksack, providing hikers with safe refreshment wherever they are. One of Katadyn's production facilities is in the Romanian city of Brasov. The plant uses oxygen, nitrogen and argon from Messer for its cutting and welding operations.

### Romania: Classic cars

The Oldtimer Studio in Moara Vlăsiei started out as a workshop where friends would get together to revamp and repair their own classic cars. This shared enjoyment of working with beautiful historic vehicles led to the formation of a highly professional company which soon became well known beyond Romania's borders. The vintage car specialists use gases from Messer in their restoration work, including Ferroline C18, acetylene, oxygen, CO<sub>2</sub> and Argon 4.8. for cutting and welding.

### Germany: Beer pipeline for heavy metal fans

At the largest metal festival in the world, “Wacken Open Air” (W:O:A), the beer flows freely every year. The festival’s latest occasion, in August 2017, saw an underground beer pipeline laid for the first time. Seven kilometres long, it supplied some 75,000 head-bangers with over 400,000 litres of the amber nectar. The pipeline was fed by 25,000-litre beer trucks. Our Gourmet CO<sub>2</sub> MegaPack cylinder bundles were connected directly to the trucks. Via high-speed taps, they ensured that six beers could be poured every six seconds.

### Spain: Welding robots and mould testing

Gedia España’s plant in Santa Margarida i els Monjos near Barcelona manufactures shock absorbers, bumpers, dashboards and other components for the automotive industry, which is currently seeing good growth rates in Spain. Messer supplies argon, Ferroline, Innoxline and carbon dioxide for the welding

robots as well as liquid nitrogen for testing the casting moulds.

### Bosnia-Herzegovina: Messer logo way up high

Never has our company logo been so close to space: Messer BH Gas supported a team of young enthusiasts in their quest to find out how far a helium-filled HAB (High Altitude Balloon) could move away from the Earth and send back photos. Our company in Bosnia-Herzegovina donated the necessary helium that carried the HAB, equipped with four cameras, to a height of 33.4 kilometres. The flight was launched from Mount Trebevic near Sarajevo and took 158 minutes. The box attached to the balloon, which contained the cameras and bore the Messer logo, was later found 47 kilometres as the crow flies from the launch site. Effort rewarded: Impressive photographs and video recordings.



## Gases and applications for all sectors of industry

### France: ENGIE and Messer team up for sustainable transport of road freight

On the occasion of the opening of an ENGIE filling station in La Courneuve in April 2017, the ENGIE subsidiary GNVERT, which specialises in the distribution of alternative fuels, and Messer announced their future cooperation. Within the framework of the partnership, the two companies intend to develop environmentally friendly solutions for use in refrigerated transport. At the new ENGIE station in La Courneuve, Messer operates a liquid nitrogen tank farm for trucks, transporters and semi-trailers equipped with cryotechnical cooling units. Operated with liquid nitrogen, the cooling units are an innovative, efficient solution that meets the new requirements in urban freight transport. This form of transport is increasingly responsible for air and noise pollution in city centres. The liquid nitrogen-based refrigeration technology is noiseless and environmentally friendly

because it is free of emissions of particulate matter, nitric oxide and CO<sub>2</sub>. This is why it presents the logistics industry an opportunity to deliver goods without harassing local residents, without pollution and without interrupting the cooling chain, even at night. Used in connection with vehicles that run on natural gas or biogas, cryotechnical cooling units for the transport sector in urban areas represent an alternative to the diesel engine. Plans envision replicating this model at many other ENGIE filling stations.

At the end of July 2017, we successfully certified the first EcoLIN filling station for liquid nitrogen in La Courneuve, France. Beforehand, nine months were spent on planning and construction as well as testing the facility. Certification was carried out in accordance with MID (Measuring Instruments Directive). This directive is applicable within the EU where measuring instruments – in this case, a liquid nitrogen flowmeter – as well as their measurement results are used in customer invoicing.



At the new ENGIE filling station, Messer operates a liquid nitrogen tank farm for trucks equipped with cryotechnical cooling units.



The hypermarket in Rungis, in the south of Paris, is visited by more than 26,000 trucks a day. A large proportion of them are refrigerated trucks that make deliveries in Paris and the surrounding area. In view of the ban on diesel vehicles that is due to come into effect in Paris in 2020, many haulage firms here are interested in alternative solutions that will help them secure their business. Messer has set up a demo station at the Rungis site and is providing support to the first companies testing this alternative refrigeration technology. Since traffic in Paris is a dominant source of noise – as it is in all other urban centres – and people generally find it disturbing, this project will benefit people living next to the hypermarket and near the busier access roads by reducing noise emissions.

#### **Spain: EcoLIN market launch**

At the beginning of October 2017 we presented our EcoLIN project at the international chemicals exhibition “Expoquimia” in Barcelona. The aim of our presence in the exhibition area “Smart Chemistry-Smart Future”, under the direction of the Spanish Business Association of the Chemical Industry (FEIQUE), was to publicise the advantages of EcoLIN in the Spanish market. The background to this is that within the C40 Climate Protection Network several cities, including Madrid, have committed to reducing greenhouse gas emissions. As of 2025 Madrid will be banning diesel powered vehicles from the city centre area.



The Oxijet process reduces consumption of fossil fuels and improves furnace efficiency.

#### **Spain: Oxygen for more efficient casting**

The Funosa foundry in Ódena, one of the largest in Spain, has introduced Messer’s Oxijet technology in its production operations. A trial period had previously been successfully completed in 2016. The Oxijet process involves blowing oxygen into a furnace. This increases the process temperature, which in turn reduces fossil fuel consumption and boosts furnace efficiency. Messer has installed the necessary equipment and is supplying the liquid oxygen. Funosa produces grey and nodular castings weighing from a few grams to 100 kilograms for customers in various branches of industry.

### **Czech Republic: Cryogenic zinc deburring**

Last December, the Beneš a Lát foundry became the first company in the Czech Republic to use a cryogenic process to deburr zinc pressure-die castings. Messer is supplying the foundry with the liquid nitrogen required for the process. The products are mainly intended for the automotive and electronics industries.

### **Germany: Nitrogen monoxide therapy**

Messer has teamed up with SALVIA medical, a company specialising in the manufacture and servicing of respirators, to offer a service package for therapy involving the use of inhaled nitrogen monoxide (NO) as a medicinal product. NO therapy is used in intensive care in connection with clinical ventilation. This involves the use of special metering and monitoring equipment.

### **Slovakia: Nitrogen averts risk of explosion at ethylene plant**

Messer supplied oil company Slovnaft with nitrogen last autumn while the latter was carrying out maintenance work on its ethylene plant at the Bratislava refinery. Considerable quantities of the gas were fed in during shutdown and recommissioning to eliminate any risk of explosion. The Messer tankers drove up at two-and-a-half-hour intervals to ensure an uninterrupted supply of gas. In addition, joint venture Messer Slovnaft's million-litre-capacity nitrogen tank was used as a buffer. The nitrogen was delivered in a cryogenic liquid state and heated with an electric heating element at a temperature of 120 to 200 degrees Celsius to facilitate sufficiently rapid evaporation.

### **Slovenia: Multiple energy use**

Carbon dioxide from Messer is helping Celje hospital save energy. A combined heat and power trigeneration system is in operation there. In addition, the surplus heat generated in the summer months is used to operate an absorption refrigerating unit. This unit uses water as a coolant. The water is continuously enriched with carbon dioxide to keep its pH value in the desired range.

### **Germany: Nitrogen for rubber deflashing**

W. Kerspe, a rubber and silicone factory in Wipperfürth, produces more than 4,000 different products, mainly for the electrical and automotive industries. The products range from extremely small moulded parts with a diameter of five millimetres to 140-cm-long windscreen wipers or power distribution boxes weighing 20kg. Kerspe uses nitrogen from Messer to deflash the rubber mouldings after production. As the cryogenic gas cools the rubber parts, the thin flash becomes hard and brittle. It is then blasted with small plastic pellets and breaks off cleanly. After deflashing, no further rework needs to be carried out on the mouldings.

### **Spain: All-round gas supply for waterworks**

The Consorci d'Aigües de Tarragona (CAT) water treatment plant purifies water from the river Ebro. It supplies 85 per cent of the population of Tarragona province as well as many industrial firms with drinking water. Messer has been supplying the plant with liquid carbon dioxide for more than ten years and once again won the gas supply contract at the end of 2016 for supply in 2017. CAT uses liquid carbon dioxide to adjust the pH in the drinking water treatment process. Since January 2017, Messer has also been supplying liquid oxygen for ozone production in the plant's own facility. The ozone gets rid of undesirable constituents in the untreated

water by means of oxidation. In addition, the plant's laboratory carries out analyses using specialty gases from Messer. The liquid nitrogen supplied in dewars is used to freeze water samples.

#### **France: Oxyfuel fuels cement production**

At one of its locations in France, LafargeHolcim uses oxyfuel technology by Messer in its cement clinker production. In this process, the raw materials – mainly limestone and clay – are heated to very high temperatures in rotary kilns. With oxyfuel, pure oxygen is used to make combustion with alternative fuels more efficient. This allows the target temperature to be reached with considerably less primary fuel consumption and a corresponding reduction in CO<sub>2</sub> emissions. In addition, oxyfuel may also enhance product quality.

#### **Czech Republic: Gases for tank production**

The customer is also a supplier: Chart Ferox in Decin supplies Messer with storage tanks for liquid gases. The manufacture of these tanks in turn involves the use of liquid nitrogen and carbon dioxide – gases that Messer supplies to the customer-supplier's site in the north of the country. Chart Ferox is part of Chart Industries, a US corporation, and specialises in the manufacture of cryogenic equipment. This also includes systems and facilities for storing and distributing liquid natural gas.



The employees of Messer in the Czech Republic were in good spirits during their visit to the Chart Ferox site, in spite of the inclement weather.

### Albania: Seafood cooled by dry ice

Fish Land, a restaurant in the capital Tirana, uses dry ice from Messer to cool freshly caught seafood in the kitchen and when serving it to customers. The solid CO<sub>2</sub> doesn't melt, it sublimates – in other words it changes directly from a solid to a gas. In contrast to ice, the gas contains no microbes – besides which it is dry and a very effective coolant. Customers are treated to an additional aesthetic experience when the food is served since the process of sublimation involves water droplets condensing out of the air, producing the characteristic mist. Meanwhile, the fresh seafood remains healthy and appetising to look at.



Food preparation using cryogenic gases presents new culinary opportunities.

### Serbia: Oils need N<sub>2</sub> und H<sub>2</sub>

Dijamant Zrenjanin, the largest Serbian producer of cooking oil, uses nitrogen from Messer to protect the quality of its products. During the bottling process, the gas is introduced into the PET bottles in liquid form. It is also injected into the headspace of storage tanks in gaseous form. In both cases, it prevents the oil from turning rancid as a result of oxidation. Dijamant Zrenjanin produces sunflower oil from local oilseed. The company's product range also includes olive, pumpkin seed and palm oil as well as margarine, mayonnaise, sauces and dressings. Since May 2017, Messer has also been



supplying hydrogen for the purpose of oil and fat hydrogenation. This process involves the conversion of liquid vegetable oils into solid or semi-solid fats such as margarine. Before that, Dijamant produced its own hydrogen in-house using an electrolysis process. Thanks to the fact that the firm is now being supplied by Messer, safety levels at the plant have been significantly improved and Serbia's last electrolysis plant has been decommissioned.

### Slovenia: Hydrogen chloride for super fleece

Messer supplies hydrogen chloride (HCl) to smartMELAMINE in cooperation with GHC. The company is a joint venture between Slovenian firm Melamin and OMPG, a Rudolstadt-based company carrying out material testing of textiles and plastics. It operates the world's first melamine fleece production facility in Kočevje. One of the remarkable features of the fleece material is its particularly effective sound and heat insulation. It is resistant to high temperatures, does not burn or melt, and is chemically stable and UV-resistant. The material is suitable for protective clothing and can also be used for insulation, for instance in the automotive and construction industries. The production of melamine requires the use of hydrochloric acid as a catalyst. The hydrogen chloride is transported in





Melamine fleece production is largely automated.

thousand-litre drums, which are enclosed in a container for additional protection. Besides the chemical, Messer and GHC have also supplied the equipment for automatic HCl dosing and for drum handling as well as a leak-detection system. The developmental groundwork for the production of the new material was carried out by the Thuringian Institute of Textile and Plastics Research (TITK) in Rudolstadt.

#### **China: Messer supplies gases in Changshou Chemical Park in Chongqing**

Messer has concluded two new pipeline gas supply contracts in the Chinese city of Chongqing. The new customers are a chemical company and a transformer manufactur-



er. Since mid-2017, the industrial gases specialist Messer has supplied new customers in the Changshou Chemical Park in Chongqing, China, with gases via a pipeline

er. The gas-supply contract between Messer and the chemical company Chongqing Feihua Environmental Science & Technology (FEST) was concluded after many rounds of negotiations. The company has been getting oxygen, nitrogen and purified air from Messer since mid-2017. The gases are supplied conveniently and safely through a pipeline system since both parties are located right next to each other in the chemical park. The gases are being used in the production of chlorine gas, which FEST supplies to another neighbour, BASF, as a raw material for the production of hydrogen chloride.

Messer has gained another new customer in the form of Wangbian. The transformer manufacturer, who is also based at the chemical park site, gets gaseous nitrogen from Messer.

#### **China: Carbon dioxide replaces sulphuric acid**

The conglomerate Mizuda uses carbon dioxide from Messer in the treatment of alkaline wastewater. The gas facilitates environmentally friendly and efficient neutralisation. Mizuda is one of the leading private companies in Zhejiang province in eastern China. The conglomerate, which was founded in 1993, is active in a number of areas, in particular waste management and wastewater treatment, as well as green electricity generation and pharmaceuticals.

The company concluded a contract with Messer in 2017 for the supply of carbon dioxide. The gas is used to neutralise alkaline wastewater. The high pH of such wastewater has to be neutralised through the addition of an acid so that it can undergo further treatment or be discharged into the sewerage system. Mizuda had previously been using sulphuric acid for this purpose. However, elaborate safety measures are required when handling sulphuric acid: its use in wastewater treatment is not only expensive, but also



In clarification tanks such as this, carbon dioxide is added to industrial wastewater to make precise adjustments to pH values.

leads to the formation of odour-intensive hydrogen sulphide as well as mineral salts.

By contrast, carbon dioxide dissolves in water to form a weak acid – carbonic acid – without unwelcome side effects. This acid fulfils the task of neutralisation but is otherwise perfectly safe and harmless.

The system that has been installed at Mizuda for pH regulation with carbon dioxide has helped reduce production costs. As a result, the company plans to work with Messer on other projects.

#### **China: Green light for OLED technology from China**

BOE Optoelectronics Technology Co. began manufacturing OLED elements at its Chengdu site in China in 2017. The high-purity gases that are required for the production process are supplied by Messer. LED technology has until now been the dominant

technology used in the displays of smartphones, tablets and wearables, as well as in TV and computer screens. In the meantime, however, organic LEDs (OLEDs) have developed to the point where they are about to supersede conventional light-emitting diodes. Thin film components of this kind offer technical advantages over their predecessors and are cheaper to produce. Up to now, worldwide production of these elements has been dominated primarily by South Korean companies. The Chinese company BOE Optoelectronics Technology Co. now wants to gain market share. At its site in Chengdu, the company has opened a facility for the development of the sixth generation of LTPS/AMOLED technology. Messer is in charge of providing the gases that this effort requires. BOE purchases nitrogen, oxygen, argon, hydrogen and carbon dioxide.

#### **Bosnia-Herzegovina: Messer BH Gas is authorised PepsiCo supplier**

Messer BH Gas, Bosnia-Herzegovina, has been approved as a supplier of carbon dioxide to PepsiCo with effect from August 2017. This means that the Messer company satisfies the world-renowned soft drinks manufacturer's exacting requirements within its CO<sub>2</sub> production process as well as meeting the highest product quality standards demanded by the customer. Messer supplies CO<sub>2</sub> as a food gas to the site operated by PepsiCo in Sarajevska Pivara. Messer's approval is valid until 2020.

# Social Commitment









# Social Commitment

Many of Messer's subsidiaries are involved in social projects. The type of involvement depends on the needs of the country in question, for Messer is usually guided in such matters by the immediate environment. In 2017, the main focus of social activities was on education, children and health. In this Sustainability Report, we publish just a few select projects to provide a sense of the range of activities in which we are involved.

In memory of Adolf Messer, who would have turned 100 on 6 April 1978, the Messer family set up the charitable Adolf Messer Foundation in 1978. As a Messer Group shareholder, the independent foundation supports science and fosters young scientists in their research and training. Prizes and funding are awarded in recognition of outstanding achievements in the natural sciences and engineering as well as in economics, social science and the humanities. In the social and health area, the Messer Family established the charitable Dr. Hans Messer Social Foundation in memory of Dr. Hans Messer. It makes donations to help

people who find themselves in need through no fault of their own.

The activities of both charitable foundations are independent of those of the Messer Group.

## Commitment to education and culture

### Bosnia-Herzegovina: Messer supports children's festival

The third International Children's Festival took place in Sarajevo in early May 2017. The aim was to give children and young people a first-hand experience of books, music and the performing arts. Children who gave the best performances in a singing and story-telling competition were awarded "writers' globes" and certificates. Messer supported the festival with dry ice and gas for balloons. The resulting mist on the stage and balloons drifting in the air gave the venue a really special atmosphere.



"Young artists" were the stars of the Children's Festival.



### Germany: Messer opens its doors to children

Diving into the exciting world of gases – Messer offers this opportunity to some 80 children each year in connection with the Bad Soden Ferienspiele, a programme of organised holiday activities.

Employees of Messer show small groups of young visitors around the permanent company exhibition, which offers lots of scope for discovery and fascinating experiences. The centrepiece of the exhibition is a 60-year-old restored air separation unit, the inside of which is visible to visitors, allowing them to gain a better understanding of the process of separating air into its main components – nitrogen and oxygen. Ground rubber and a doll's refrigerator illustrate even more clearly for children how industrial gases are needed for environmental protection, for instance in the recycling of reusable materials. Xenon lamps, helium balloons and a welded bicycle frame then make the message clear: while the world of gases may be invisible, it is no less exciting.

### Commitment to Environment, Health and Social Issues

#### France: "Seals of hope"

Messer France collects used and defective gas cylinder seals at its Saint-Georges site – for a good cause: the seals go to Les Bouchons de l'Espoir ("Seals of Hope" in English). This organisation sells the plastic closures to a recycling firm, which produces recyclable plastic granules from them.



Many people in need have already been helped thanks to our Messer France colleague Dominique Juin's initiative.

The proceeds go to help people with disabilities: for example, Les Bouchons de l'Espoir provides funding for wheelchairs or the alteration of homes to fit the needs of the disabled. "My colleagues were on board from the beginning," says a delighted Dominique Juin, a Messer France employee and the founder of Les Bouchons de l'Espoir. "I really appreciate this support. Instead of simply disposing of the used seals, they now benefit a good cause."

### **Hungary: Support for socially disadvantaged families**

Messer Hungarogáz asked its employees for their assistance with a social project: The team were to help decide which social organisation the company ought to support in future. Three institutions that support socially disadvantaged groups were proposed. The result of the poll reflects the family character of Messer: the majority favoured an organisation that runs a temporary home for families. These families were also invited to attend Messer Hungarogáz's Family Day, where they could spend a carefree afternoon with our colleagues. Messer Hungarogáz was delighted to see such a large turn-out on the part of the staff.

### **Spain: A bicycle for more joie de vivre**

Messer Ibérica promotes the good idea provided by one welding gas customer in Tarragona: he developed a special bicycle for people with disabilities. The clever thing about this bike is that it can be adapted to the particular needs of the rider. Development of the various prototypes, including one to which a trailer or platform for a wheelchair can be docked, was completed in November 2017. The bike will be presented to the disability associations toward the end of the year.

### **Germany: Christmas market in unique setting returns**

For three years, Messer in Bad Soden has hosted a Christmas market for a good cause. On 29 and 30 November 2017 from 4pm to 9pm, visitors to the market on the Messer-Platz square had the opportunity to purchase arts and crafts, home accessories, fashionwear and much more besides for the cold season. The proceeds from Messer's Christmas market stalls will be donated to Hilfe für krebskranke Kinder Frankfurt e.V., a Frankfurt-based organisation that helps children with cancer.

### **Germany: Biophysicist Benesh Joseph receives Adolf Messer Foundation Award 2017**

The Adolf Messer Foundation Award 2017 was presented on 19 September 2017 at a ceremony in Goethe University's Guest House: Benesh Joseph, a biophysicist at Goethe University since 2013, received the award, with prize money of 25,000 euros, for his research in the field of pathogenic bacteria. The Adolf Messer Foundation has presented the award to outstanding young scientists in the field of basic experimental research at Goethe University since 1994. It is given in recognition of innovation, scientific curiosity and pioneering spirit. This year's award was presented by Birgitta Wolff, President of Goethe University, and Honorary Senator Stefan Messer, Chairman of the Foundation Board of the Adolf Messer Foundation. Through his work, Benesh Joseph is contributing to the development of new alternative therapy options to counter the multidrug and antibiotic resistance of pathogenic bacteria.

## Messer Group – GRI Content Index – 'in accordance' Core

The GRI Content Index shows at a glance how the Messer Group's corporate responsibility report meets the requirements of GRI. The Index shows the standard indicators we have considered and to what extent, as well as where these can be found on the company's website or in the Corporate Responsibility Report and Management Report (CRR&MR). In addition, the GRI Content Index includes explanations and supplementary information on selected standard indicators. Further information can be found in the GRI Annex under [www.messergroup.com/gri-content-index](http://www.messergroup.com/gri-content-index). For this report, GRI conducted a Content Index Service. GRI hereby confirms that the GRI Content Index is accurate and aligned with the requirements of disclosure G4-32, and the Standard Disclosure Labels are clearly indicated in the report (e.g. "G4-18", "G4-DMA" or "G4-EN5"). The disclosures on material issues that are not represented by a GRI aspect (at the end of the Index) are not within the scope of GRI's service.



General standard disclosures		
General standard disclosure	Page or link	External Assurance
<b>Strategy and analysis</b>		
G4-1	CRR&MR p. 15	–
<b>Organisation's profile</b>		
G4-3	CRR&MR p. 101	–
G4-4	CRR&MR p. 101	–
G4-5	CRR&MR p. 101, p. 145	–
G4-6	CRR&MR p. 101, p. 144	–
G4-7	CRR&MR p. 134	–
G4-8	CRR&MR p. 2	–
G4-9	CRR&MR p. 2, p. 113, p. 116	–
G4-10	CRR&MR p. 2, p. 105	–
G4-11	CRR&MR p. 40	–
G4-12	CRR&MR p. 54	–
G4-13	CRR&MR p. 101	–
G4-14	CRR&MR p. 122	–
G4-15	CRR&MR p. 16	–
G4-16	CRR&MR p. 26	–



Identified material aspects and boundaries			
G4-17	CRR&MR p. 144		–
G4-18	CRR&MR p. 16		–
G4-19	CRR&MR p. 17, p. 18		–
G4-20	CRR&MR p. 16		–
G4-21	CRR&MR p. 16		–
G4-22	no restatements of previous information revealed in CRR.		–
G4-23	CRR&MR p. 101		–
Stakeholder engagement			
G4-24	CRR&MR p. 31		–
G4-25	CRR&MR p. 31		–
G4-26	CRR&MR p. 16, S. 31		–
G4-27	CRR&MR p. 16		–
Report profile			
G4-28	CRR&MR p. 101		–
G4-29	1 June 2017		–
G4-30	CRR&MR p. 31		–
G4-31	CRR&MR p. 145		–
G4-32	Further information can be found in the GRI Annex published on the Internet at: <a href="http://www.messergroup.com/gri-index">www.messergroup.com/gri-index</a>		–
G4-33	CRR&MR p. 13; the corporate responsibility report has not been audited externally		–
Governance			
G4-34	CRR&MR p. 12		–
Ethics and integrity			
G4-56	CRR&MR p. 23		–

Specific standard disclosures			
DMA and indicators	Page or link	Omissions	External Assurance
Category: Environmental			
Aspect: Energy			
G4-DMA	CRR&MR p. 67		–
G4-EN3	CRR&MR p. 68		–
G4-EN5	CRR&MR p. 68		–
G4-EN6	CRR&MR p. 67, p. 108		–
G4-EN7	CRR&MR p. 68, p. 108		–

Specific standard disclosures			
DMA and indicators	Page or link	Omissions	External Assurance
<b>Category: Environmental</b>			
<b>Aspect: Emissions</b>			
G4-DMA	CRR&MR p. 67		–
G4-EN15	CRR&MR p. 69		–
G4-EN16	CRR&MR p. 68		–
G4-EN17	CRR&MR p. 68		–
G4-EN19	CRR&MR p. 68		–
G4-EN20	none		–
G4-EN21	none		–
<b>Aspect: Effluents and waste</b>			
G4-DMA	CRR&MR p. 69		–
G4-EN24	none		–
G4-EN25	none		–
<b>Aspect: Compliance</b>			
G4-DMA	CRR&MR p. 27		–
G4-EN29	none		–
<b>Aspect: Transport</b>			
G4-DMA	CRR&MR p. 63		–
G4-EN30	CRR&MR p. 63, p. 104		–
<b>Category: Social</b>			
<b>Sub-Category: Labour practices and decent work</b>			
<b>Aspect: Employment</b>			
G4-DMA	CRR&MR p. 105		–
G4-LA1	CRR&MR p. 39		–
G4-LA2	CRR&MR p. 108		–
<b>Aspect: Occupational health and safety</b>			
G4-DMA	CRR&MR p. 59		–
G4-LA6	CRR&MR p. 59, p. 104		–
G4-LA7	none		–
<b>Aspect: Training and education</b>			
G4-DMA	CRR&MR p. 39		–
G4-LA9	CRR&MR p. 39		–
G4-LA10	CRR&MR p. 40		–
G4-LA11	100%		–

<b>Sub-Category: Human rights</b>			
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<b>Aspect: Non-discrimination</b>			
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G4-DMA	CRR&MR p. 40		–
G4-HR3	CRR&MR p. 40		–

<b>Sub-Category: Society</b>			
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<b>Aspekt: Compliance</b>			
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G4-DMA	CRR&MR p. 27		–
G4-SO8	none		–

<b>Sub-Category: Product responsibility</b>			
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<b>Aspect: Consumer health and safety</b>			
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G4-DMA	CRR&MR p. 59		–
G4-PR1	CRR&MR p. 62, p. 103		–

<b>Aspect: Product and service labelling</b>			
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G4-DMA	CRR&MR p. 75		–
G4-PR3	CRR&MR p. 62, p. 103		–
G4-PR5	CRR&MR p. 73, p. 109		–

<b>Aspect: Compliance</b>			
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G4-DMA	CRR&MR p. 27		–
G4-PR9	none		–

<b>Further material issues for Messer Group (not represented by a specific GRI Material Aspect)</b>			
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<b>Issue: Open communication and cooperation with stakeholders</b>			
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G4-DMA & Indicators	CRR&MR p. 31, see G4-24 - G4-26 and G4-30		–
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<b>Issue: Independence, secure finances/sustainable economic resources</b>			
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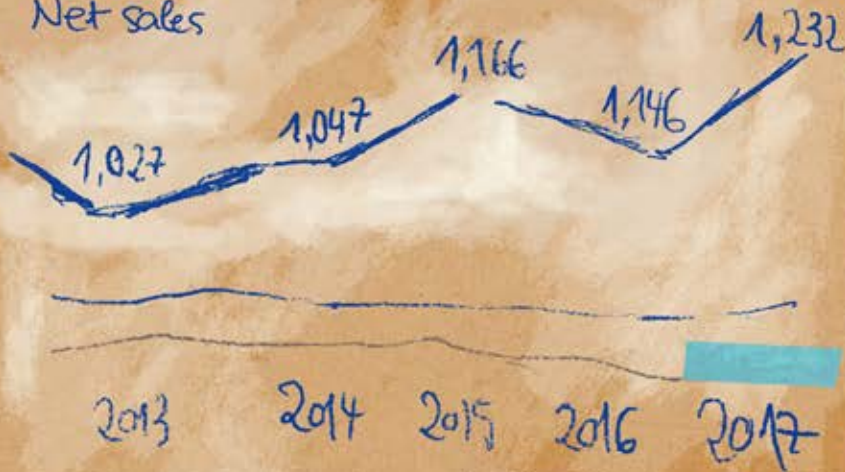
G4-DMA & Indicators	CRR&MR p. 23, see G4-56		–
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# Group Management Report

Net sales



Employees







# General Information on the Group

## Overview of the activities of the Messer Group

Messer Group GmbH (“the Company”), an industrial gases manufacturer, has its registered office in Sulzbach/Taunus near Frankfurt am Main and its postal address in Bad Soden am Taunus. It acts as management holding company and, together with its subsidiaries and affiliated companies, forms the Messer Group (“the Group”).

G4-3  
G4-5

From acetylene to xenon, the Messer Group offers a product portfolio that must surely count as one of the most diverse in the market – the Company produces industrial gases such as oxygen, nitrogen, argon, carbon dioxide, hydrogen, helium, shielding gases for welding, specialty gases, medical gases and a wide variety of mixed gases.

G4-4

In state-of-the-art competence centers, the Messer Group develops application technologies for the use of gases in almost all branches of industry, in foodstuffs technology, medicine and research and science.

G4-6

The Group has its own operating facilities in 40 countries. Messer is therefore represented in each of the main markets in Europe (with the exception of the United Kingdom and Scandinavia) as well as in Asia and Algeria.

In Krefeld, Germany, Messer operates a highly specialized technical center for testing in the areas of cold grinding and recycling. In the area of welding and cutting, the Messer Group’s specialized technical centers in Germany, Hungary and China develop new technologies, mixed gases and applications. Our prime focus is on a future-oriented approach to our products, tailored to the needs of our customers. Gumpoldskirchen, near Vienna, Austria, is the hub for ongoing development of high-temperature processes, with customers, cooperation partners and research institutes. Numerous tests for the food-processing, pharmaceuticals and chemicals/environment sectors were performed at our Technical Center in Mitry-Mory, near Paris, France. In 2018, the Technical Center for food-processing, pharmaceuticals and chemicals/environment in Mitry-Mory will be relocated to Krefeld, Germany.

## Changes in the group reporting entity in the fiscal year 2017

G4-13, G4-23,  
G4-28

The group reporting entity changed as follows during the year under report:

### First-time consolidations

The following entities were founded or acquired and commenced operations in 2017:

- Messer (Thailand) Co. Ltd, Thailand, 79 %
- PT. Chemindo Inti Usaha, Indonesia, 56 %

In accordance with a purchase agreement dated December 16, 2016, Messer Group GmbH acquired 60% of the shares of Universal Industrial Gas Sdn. Bhd, Malaysia. Smart-Gas Pte. Ltd., Singapore, in which Messer Group GmbH already had a 30 % investment, acquired a further 15 % of the company's shares. Following the closing of the contract on February 28, 2017, the definitive purchase consideration amounted to K'MYR 9,251 (= K€ 1,985). In addition to the payment on account of K'MYR 800 (= K€ 174), a further portion of the purchase price amounting to K'MYR 8,222 (= K€ 1,763) was paid on February 28, 2017, and the remaining K'MYR 230 (= K€ 48) on June 15, 2017.

The acquisition is part of the strategic business expansion in South-East Asia. The Messer Group plans to invest and further optimize production processes, including both safety and quality aspects, in order to ensure its competitiveness on the rapidly growing Malaysian market. The acquisition of shares in Universal Industrial Gas Sdn. Bhd enables Messer to contribute its application know-how to support production at the level of Smart-Gas Pte. Ltd, and thus to participate in Malaysia's economic growth.

### Other

Effective January 1, 2017, Remco AG, Switzerland, was merged with ASCO Kohlensäure AG, Switzerland. Also effective January 1, 2017, Messer Iparigáz Kft., Hungary, was merged with Messer Hungarogáz Kft., Hungary. Neither of these mergers had a significant impact on the consolidated financial statements.

Effective January 30, 2017, the liquidation of Argos Ltd., Ukraine, became valid in law and the company – previously consolidated as an associated company – ceased to be part of the group reporting entity. The liquidation of this entity did not have any significant impact on the consolidated financial statements.

Chengdu Chenggang Messer Gas Products Co., Ltd., China, operates a customer supply pipeline in the Qingbaijiang industrial estate, which was laid across the property of the largest on-site customer. In 2015, the customer discontinued steel production permanently. During the year under report, our subsidiary was informed that the pipeline is required to be removed. It is therefore extremely doubtful whether Chengdu Chenggang Messer Gas Products Co., Ltd. will continue as a going concern. For this reason, the subsidiary's financial statements were no longer drawn up on a going concern basis. All the company's assets were measured on the basis of liquidation values.

With a view to optimizing the regional structure and focusing on our core markets in Europe and Asia, Messer Group GmbH sold all its shares (99.83 %) in Messer Gases del Peru SA on December 22, 2017. The company will cease to be part of the Messer Group reporting entity on completion of the transaction, effective February 1, 2018.



## Financial performance indicators

The Messer Group uses parameters based on operating performance indicators to manage its business. The principal indicators are sales, EBITDA, investments, net debt and ROCE. Further explanations and the make-up of the indicators are provided in the sections on earnings performance and financial position.

## Non-financial performance indicators

Safety, health, environmental protection and quality ("SHEQ") have been firmly embedded in Messer's guiding principles since its foundation in 1898 and continue to have the utmost priority in the operations of the family-owned company. Messer is aware that well-organized safety and quality guidelines form the basis for dealing safely with operational risks and improving operational performance. For this reason, the health and safety of our workforce and the protection of the environment are firmly embedded in total quality management systems and are reflected in various Messer Group Standards.

To take account of the growing importance of ensuring a healthy environment, social justice and effective business management, the Messer Group has embarked on the introduction of Corporate Responsibility Management ("CSR"). CSR follows a long-term approach and will contribute to the sustainable development of Messer. To this end, the Messer Group has also enhanced its SHEQ performance indicator system.

During the past fiscal year, 990 (2016: 946) SHEQ-related inspections and checks were carried out throughout the Messer Group (of which 859 in Europe), resulting in numerous improvement measures.

In addition, 192 ideas and suggestions for improvements were submitted by our staff members throughout the Messer Group (of which 85 in Europe). The suggestion rate within the Messer Group therefore stood at 0.03 ideas per employee.

### Occupational safety

Occupational safety is of the utmost importance for all Messer companies. The Messer safety guidelines clearly reflect our position: "All industrial illnesses, injuries and accidents are avoidable".

G4-PR1, G4-PR3

Messer uses its global management system to identify and control potential operational risks. The principles of this system are carefully documented in its SHEQ manual and cover all safety-relevant areas such as risk management, safety training, safety inspections, personal protective equipment, communication safety and accident investigations. The SHEQ Manual is a constituent part of the Messer Group's Compliance Management system and is regularly updated and improved.

In 2017, additional safety guidelines were drawn up especially for work in acetylene plants and made available to staff and customers.

In addition, a new brochure for the series "Safety Pocket Guides" was written and distributed to staff and customers. The fourth guide in the series focused on the safety of customers in connection with the transportation of dry ice.

During the fiscal year 2017, 19 safety audits were conducted to underline and ensure compliance with the SHEQ standards in all of the Messer Group's operational activities. The success of the safety measures and initiatives is assessed by means of the following annual performance indicators: working accidents causing lost days and accident frequency (number of working accidents causing lost days per million hours worked) and accident severity (days lost per million hours worked).

G4-LA6 In 2017, 15 working accidents causing lost days were reported. Accident frequency therefore decreased sharply year-on-year (25 accidents or 2.4 accidents per million hours worked). The level of accident severity fell to 45.4 days lost per million hours worked.

	2013	2014	2015	2016	2017
Working accidents causing lost days	38	18	22	25	15
Accident frequency	3.6	1.7	2.2	2.4	1.4
Accident severity	61.3	47.6	65.1	77.9	45.4

As a specialist in industrial gases, Messer is aware of its duty in relation to its staff and customers to efficiently identify and avoid potential work-related risks. With campaigns such as our "Safety Day", we highlight potential hazards and endeavor to raise safety-at-work consciousness.

Unfortunately, one fatal accident occurred in 2017: during inspection of paintwork on a storage tank, a worker fell from five-meter high scaffolding and died of his injuries.

Messer is an active member of the European Industrial Gases Association (EIGA) and of the Industrial Gases Association (AIGA) in China. Our experts actively exchange experience, knowledge and lessons to learn from incidents in the industrial gases sector. In addition, some Messer Group entities cooperate with local research institutes and universities to enhance safety in production processes.

#### G4-EN30 **Transport safety**

The transportation of gases and equipment on the road and customer deliveries are activities which involve the most risks in the gas industry. For this reason, the Messer Group has put its signature to the European Road Safety Charter, thus undertaking to place particular emphasis on transport safety. As well as complying with applicable laws and regulations for operating a vehicle fleet, the Messer Group's own transport safety plan has proved invaluable.

A large proportion of the drivers working for Messer are employed by external transport firms, which are responsible for training the drivers in accordance with the ADR (European Agreement concerning the international carriage of dangerous goods by road). Messer has also drawn up its own modular driver training package, which is used to train drivers. The main themes covered by the training are:

- Laws and regulations (ADR and national provisions)
- Technical aspects (hazards arising from product, vehicle and tank technology, vehicle checks, safety technology)
- Accident avoidance
- Defensive, economical driving

In addition, all drivers receive a driver manual specific to their work (bulk, cylinders or service vehicles). This ensures that drivers have immediate access to all important information relating to their activities.

Furthermore, Messer specialists are actively involved in all relevant EIGA bodies and to a large extent too in the national associations. The findings from the activities conducted within these bodies are incorporated in the driver manual and the driver training scheme on an ongoing basis, with a view to enhancing transport safety. In this way, the Messer Group is making its contribution to a steady reduction in the number of transport incidents.

## Employees and corporate culture

### Worldwide workforce

The Messer Group had an average worldwide workforce in 2017 of 5,633 employees (2016: 5,487 employees), each contributing to the success of the business with his or her extensive knowledge, ideas, know-how, motivation, attitude to work, active commitment and in many cases longstanding experience.

G4-DMA  
employment,  
G4-10

The average number of employees per region was as follows:

	Jan. 1 - Dec. 31, 2017	Jan. 1 - Dec. 31, 2016
Western Europe	1,108	1,083
Central Europe	752	749
South-Eastern Europe	1,354	1,346
China, ASEAN and Peru	2,419	2,309
<b>Total number of employees</b>	<b>5,633</b>	<b>5,487</b>

As at December 31, 2017 approximately 88 % of our employees were working in non-German speaking countries.

### Training and the Messer Group Academy

The expertise and experience of our workforce of well-motivated and well-qualified employees provides the foundation for the Messer Group's success. They are constantly being required to rise to the practical challenge of highly demanding tasks and projects, at which stage they can also draw on the knowledge gained through attendance at internal and external training courses, specifically designed to meet their needs. This combined approach gives them the wherewithal to master the vast array of constantly changing work requirements, while at the same time enhancing the professional manner with which they go about their work. A transparent leadership style, based on an "open door" principle, allows for open communication and remains a core element of our management culture.

We endeavor to make school pupils and students aware of the potential of the fascinating world of gases, also with an eye to winning well-trained staff in the future. It is considered to be a crucial aspect of business to develop employee skills from an early stage. The Messer Group is committed to providing educational and vocational training opportunities to young people, based on the tenet that vocational training for the next generation is essential for the future competitiveness and underlying strength of our business. In Germany we offer vocational training to ambitious school and college leavers in the areas

of industrial business studies, mechatronics, IT data processing and IT support. Training takes place at various sites, in some cases supplemented by several weeks spent at international locations.

The Messer Group Academy expands the range of systematic development programs available to employees, including a range of training courses and lectures as well as the annual autumn lectures for our managers and junior executives. A further series of seminars was held in 2017 for the Junior Circle, our program for the next generation of managers, with participants from various national companies and specialist areas. In July 2017, the second group successfully completed the Junior Circle with their "BioKryo" project work. Cryo-preservation is a procedure to preserve cells or complete tissue by cooling to very low temperatures. These low temperatures render biological activity impossible, including biological reactions which would cause cell death. The results of the project work will be implemented under a cooperative agreement with BioKryo GmbH.

Following the Junior Circle II, the third Junior Circle group was launched in July 2017. It will be addressing the topic "Digitalization in the Messer World" over the coming two years.

The focus of the Junior Circle is on the dissemination of knowledge by our own experts from various functions within the organization. Aspiring managers will attend five one-week modules covering various fields of focus, including inter-cultural training. The principal objective of the Messer Academy will be to provide an insight into our products, technical solutions, structures and specific internal issues based on a comprehensive and practice-oriented approach. Effective networking of the participants is also a primary concern. Training in the Junior Circle is organized over a two-year period, with candidates being selected and invited directly by the management under an internal application procedure.

At the Messer Group Academy, the transnational training course for cylinder salesmen "Focus on Cylinder" was continued in 2017, with training provided in the Messer companies in Switzerland, France, Spain, Belgium, Poland and the Baltic region. Staff from eight European companies participated in the training program.

This international, standardized sales training course consists of six modules, is offered to a maximum of 14 participants and takes place in the respective national language. In addition to internal and external speakers, the respective sales manager and deputy are trained as co-trainers who are then able to provide support for future training courses. Throughout, country-specific needs are taken into account in terms of training content.

The training needs of Messer Group staff are discussed on the occasion of annual employee performance reviews with the local HR departments responsible for drawing up specific training plans.

An "English offensive" has been in progress worldwide since 2014 to increase knowledge of English in the Group. In each company, employees, split into three groups according to their language skills, have the opportunity to improve their language qualifications. Some employees have already taken the opportunity to acquire a Cambridge certificate, which is recognized worldwide.

Furthermore, 2017 saw the first-time successful launch of the online e-learning training platform for pharmacovigilance.



## Digitalization

The Messer Group has also responded to the changing market requirements in the field of digitalization. On September 1, 2017, a newly created position of Group Digital Officer (GDO) was filled. The GDO's remit is to support central functions and national companies in the design and development of digitalization projects and to ensure that projects are making progress. On January 1, 2018, a newly created position of Group Security Officer (GSO) was also filled. The GSO is responsible for advising central functions and national companies on IT security issues.

During the annual worldwide HR-Meeting in September 2017, the HR managers of the national companies also addressed the topic of "digitalization". During a workshop, development and application possibilities were worked out (video interviews—recruitment platforms, Wade and Wendy online training platform for job-seekers and recruiters, review of the performance review, etc.). The exchange of information and knowledge served, in a first step, to identify the needs, expectations and requirements of different interest groups with a view to subsequent gradual implementation of the necessary digitalization measures.

## Uniform employer branding

The Messer Group's Employer Branding project is an international program aimed at depicting a corporate culture that is easy to recognize and understand. On the one hand, it is seen as a way of tying in new and current employees more closely to the business, but also as a means of getting potential employees to be enthusiastic about us, our products and our solutions, achieving the anticipated result of receiving fewer, but qualified applicants. As a flanking measure, image promotion films and posters have been completed and the Group's website optimized, including a redesigned career page. An in-house job applications portal has been created and made available to the national companies for adaptation. In 2017, the job applications portal was also used in Austria. In this way, the Messer Group, via uniform employer branding, will be able to showcase itself as an international, versatile, attractive employer.

Messer invests in vocational training for young employees. This human resources strategy, in combination with the know-how of our workforce and our high-quality products, ensures that we enjoy an excellent reputation among customers, partners and job-seekers alike.

## Environmental management

The environment must be protected at all times and in all places. As a company, Messer takes this obligation very seriously and employs its global management system to further the protection of the environment. Internal environmental protection guidelines are documented in the Messer Group's SHEQ manual. These and the environmental management systems in place at all the subsidiaries follow international standard ISO 14001 and recommendations of the European Industrial Gases Association EIGA (for example, EIGA IGC Doc. 107 — Guidelines on Environmental Management Systems). In 2017, 21 of our subsidiaries obtained external certification of their environmental management systems, the same number as in 2016.

Efficient use of energy goes without saying at Messer and is clearly in the Group's own interests. With the main aims of cost-cutting and economic use of resources, energy management is an ongoing process which also makes a contribution to reducing our CO<sub>2</sub> emissions. Our energy management system has been certified in accordance with ISO 50001 at all Messer production facilities in Germany and Spain. A total of nine Messer companies are thus now certified in accordance with ISO 50001.

Messer uses atmospheric air and electrical power at its production sites as the main raw materials to produce the air gases nitrogen, oxygen and argon. Production by means of air separation plants accounts for over 75 % of total energy consumption. Particular emphasis is therefore placed on the ongoing improvement of energy efficiency. Accordingly, Messer has assigned the specific task to a Global Energy Officer ("GEO") to increase the energy efficiency of the Group's air separation plants.

Continuous monitoring of plant efficiency brings to light any energy variations and enables potential for improvement to be identified. Working together with local managers, projects are continuously initiated in order to improve energy efficiency.

The key environmental data of Messer's production activities during the past year are as follows:

G4-EN6, G4-EN7

The volumes of gases produced rose by 11 % compared to the previous year, as a result of which the electricity consumption of the Group's air separation plants also rose. On the other hand, energy efficiency, measured in terms of energy consumption per cubic meter of gas sold, improved by 1.7 % compared to the previous year.

New on-site plants were commissioned again in 2016 with a view to bringing about a reduction both in transport costs for the delivery of liquefied gases and at the same time in CO<sub>2</sub> emissions. These plants are used for on-site gas production and save approximately 2,300 truck journeys and 420 tons of CO<sub>2</sub>. As a result, local customers benefit from flexibility and security of supply.

In Hungary, a new production line was commissioned for the manufacture of CO<sub>2</sub> for the food industry, with an annual capacity of 45,000 tons. An optimized plant design enabled the energy consumption to be reduced by more than 20 MWh per month compared to the existing production line.

In addition to new construction projects, there are also a large number of smaller-scale activities that contribute to improving energy efficiency.

At a major air separation plant in South America, control of product compressors was optimized through installation of new equipment, allowing savings up to 400 MWh of electricity per month.

In an Asian plant, the visualization of customer purchases was significantly improved by installing new measuring equipment. This equipment enables the operator to react considerably more quickly and effectively to the changing pattern of customer purchases. Discharges of unused product were nearly halved, leading to reductions in annual electricity consumption of more than 3,000 MWh.

All national companies have replaced old light bulbs in production halls and administrative buildings with low-energy LED bulbs. The absolute saving for each individual measure is admittedly small, but the total results in a significant energy saving.

G4-LA2

### Health management

Messer is aware of its social responsibility and its impact on employees, as employees play a decisive role in all work processes. Messer therefore aims to ensure the health and well-being of the individual through its working standards. For instance, Messer introduced various health programs, such as free access to fit-

ness and wellness centers for employees and their families. Measures of this kind are designed to promote a healthy lifestyle among employees.

Furthermore, a comprehensive training program for handling gas cylinders was initiated, with a view not only to reducing accidents associated with this, but also to improving the prevention of industrial diseases such as musculoskeletal disorders.

### Customer satisfaction

G4-PR5

Customer satisfaction is a key factor in the success of the Messer Group. Measuring customer satisfaction allows the services provided to be monitored and the effectiveness of measures implemented to be verified, thereby increasing customer satisfaction and, in the long term, enabling the Messer Group to improve performance continually. In 2017, more than 14,000 Messer Group customers in six countries were asked whether they were satisfied with the services received. This number represents a 57 % increase on the previous year. The percentage of customers completing the questionnaire in full fell compared to the previous year (10.9 %) to 6.4 %. Overall, 879 customers responded. The number of customers completing the questionnaire in part also fell from 478 to 447. On a scale of 1 for very dissatisfied to 10 for very satisfied, the overall performance of the Messer Group in Europe as a whole achieved a rating of 8.49, similar to the previous year's rating of 8.51 %.

The online questionnaire on general customer satisfaction consists of between 9 and 21 questions. To measure satisfaction, an analysis is carried out of whether the customers were satisfied with the services in general, whether customers consider it advantageous to be supplied by Messer and whether they are prepared to recommend Messer. The questionnaire focuses on 15 services provided by Messer and assessed by customers.

The results of the customer satisfaction analyses in individual national companies are not always comparable, owing to differences in mentality in the individual countries when it comes to assessing levels of satisfaction. Carrying out the customer satisfaction analyses regularly ensures that satisfaction within a country can be compared. The customer satisfaction analyses should be repeated for each national company every two years.

In 2017, the survey was repeated for Messer companies in France, Austria, Bulgaria, Romania, the Netherlands and Slovakia,. With the exception of France, where the general satisfaction fell from 7.7 to 7.4, it proved possible to maintain general satisfaction at a high level or even to improve it in all of the other countries. In Austria, a score of 9.1 was received for general satisfaction, in line with the previous survey's high level. In Bulgaria too, customers are very satisfied, with the overall performance in 2017 rated at 9.4 in 2017, the highest level achieved by the Messer Group. In 2015, the score for general satisfaction was 8.9. In Romania, customer satisfaction rose from 8.8 to 8.9. A slight improvement in satisfaction was also achieved by the services in the Netherlands. In the last survey, in 2014, an assessment of 7.7 had been achieved. This rose in 2017 to 8.1. In Slovakia, overall performance was again assessed at a very high level of satisfaction of 8.9, which represented a further improvement compared to the assessment of 2015 (8.3).

In addition to customer satisfaction, the satisfaction of the gas centers was also surveyed. Gas centers are external distribution partners which sell industrial gases to our customers on our behalf in defined

regions. Cooperation with the gas centers is very important, since they maintain direct contact with our customers in their region. This was the first time that we had assessed satisfaction regarding our collaboration with gas centers in France. In Spain, this survey has already been carried out for several years. In total, 229 gas centers were contacted, of which 43 completed the questionnaire in full and 13 in part.

The online questionnaire consists of a total of nine questions, which, in addition to general satisfaction, also cover the gas centers' assessment of the service quality of the various Messer departments.

The general satisfaction of the gas centers in France in 2017 resulting from this first survey stood at 7.0. In Spain, the general satisfaction increased from 6.6 in 2016 to 7.6 in 2017.

The survey results are evaluated at regular intervals and are taken as an opportunity to make improvements to the relevant areas.

# Financial Report

## General economic conditions and sector environment

The various products made from industrial gases and related services and technologies are used in almost all branches of industry, but also in the foodstuffs technology, medicine and research and science sectors. For this reason, gross domestic product (GDP) is a highly relevant indicator for the Messer Group's performance.

In 2017, expectations for global economic growth were well exceeded. According to analyses of the International Monetary Fund (IMF)<sup>1</sup> and the World Bank<sup>2</sup>, the pace of growth accelerated significantly year-on-year. According to the World Bank, real global GDP is estimated to have increased by 3.0 % in 2017, whereas an increase of 2.4 % was recorded in 2016. The growth trend was virtually synchronous worldwide. The GDP-growth rate picked up in both the emerging and developing countries and the developed industrialized countries. However, in 2017 too, there were still two-speed GDP growth rates, although both at a generally higher level, currently estimated at 4.3 % (2016: 3.7 %) for the emerging and developing countries and 2.3 % (2016: 1.6 %) for the developed industrialized countries.<sup>1</sup>

Economic development in Europe, in line with the global economic acceleration, improved appreciably in 2017. According to the figures of the Organization for Economic Cooperation and Development (OECD)<sup>3</sup> GDP in the euro area rose by an estimated 2.4 % in 2017. If this figure turns out to be correct, the growth rate in the region would have accelerated by a further 0.6 percentage points compared to the previous year. As far as the larger economic areas are concerned, a corresponding acceleration in GDP-growth was recorded in Germany, France and Italy. Only Spain experienced a slight slowdown in

<sup>1</sup> World Economic Outlook, Update January 22, 2018

<sup>2</sup> Global Economic Prospects, January 2018

<sup>3</sup> OECD Economic Outlook – No.102, Update November 2017



GDP-growth. That said, with an estimated growth rate of 3.1 %, Spain remained the faster-growing of the larger economic areas in Europe. Estimated GDP-growth in Europe outside the euro area was again stronger in 2017 than in the euro area, as illustrated by the examples of Slovenia (4.9 %), Poland and the Czech Republic (both 4.3 %) and Hungary (3.9 %).

In China, GDP-growth in 2017, contrary to expectations, did not fall off further but, according to World Bank estimates, even increased from 6.7 % in 2016 to 6.8 %. The Chinese Government is continuing in its endeavor to reduce the Chinese economy's dependence on exports by boosting domestic demand, with a corresponding focus on consumption and services. So far, however, this has not caused China to lose its top spot in the world's GDP-growth table.

## Review of operations

General economic conditions in the fiscal year 2017 were more or less ideal. Especially in China, the Messer Group encountered unexpectedly dynamic economic activity, which was particularly evident in the steel production sector, where business levels picked up sharply, and in the generally strong demand for liquefied gases. This development came at the same time as an economic recovery in Europe, with nearly all countries recording a perceptible upturn. These favorable economic conditions helped the Messer Group in 2017, contrary to our forecast at this stage last year, to achieve a significant year-on-year sales growth in 2017. In the final analysis, sales went up by 7.5 %. Similar to the sales performance, the Messer Group's EBITDA turned out considerably better than our original forecast for the year. Instead of the sharp decline in EBITDA forecasted for 2017, EBITDA actually increased by more than 16% compared to the previous year. Positive developments in China, which far exceeded expectations, made the decisive contribution to this outcome.

Including the impact of the USPP currency hedge and contrary to the prediction made in the previous year's management report, the Messer Group again managed to reduce net debt during the reporting period from K€ 379,335 to K€ 290,139 at December 31, 2017.

## Overall situation

### Results of operations

Messer Group generated worldwide sales of K€ 1,231,847 in 2017 (2016: K€ 1,145,790) which can be analyzed by region as follows:

Sales	Jan. 1 - Dec. 31, 2017	Jan. 1 - Dec. 31, 2016	Change in 2017
China, Vietnam, ASEAN and Peru	472,273	402,049	
Western Europe	360,744	368,622	
South-Eastern Europe	202,973	188,183	
Central Europe	195,857	186,936	
	<b>1,231,847</b>	<b>1,145,790</b>	<b>7.5%</b>

The Messer Group's sales in the financial year 2017 were 7.5 % up on the previous year's figure. Business developed in the various regions as follows:

### **China, Vietnam, ASEAN and Peru**

In local currency terms, sales in China rose by 22 % year-on-year. Here, the partly unexpectedly strong economic growth rate recorded in China had a positive impact on the industrial gases sector. Our companies benefited mainly from the renewed upturn in steel production and in particular from very high demand for liquefied gases, accompanied by rising market prices.

Sales in Vietnam fell by 15 % compared to the previous year. Excluding the one-time contribution to sales resulting from the accounting treatment applied for plants in accordance with IAS 17 (in conjunction with IFRIC 4) in the previous year, sales were 2 % down on the previous year. However, this decline was exclusively attributable to the depreciation of the Vietnamese currency compared to the previous year. In local currency terms, sales grew by a solid 3 % in 2017, driven in part by increased demand from our on-site customer, Hoa Phat, and the utilization of further production capacity for liquefied gases in the north of the country.

Our companies in the ASEAN region made a € 2.5 million contribution to overall sales.

### **Western Europe**

Sales in this region fell 2 % year-on-year, whereby lower sales of our central Engineering Department in the Corporate Office and the generally weaker economic environment in Switzerland played a disproportionately significant role. In all other countries in the region, however, recorded sales growth, with Spain and the Benelux countries posting the biggest growth rates.

### **South-Eastern Europe**

Sales of the Messer Group in South-Eastern Europe rose sharply by 8 % or (7 % excluding exchange rate factors). With the exception of our business activities in Albania and Romania, all countries posted strong sales growth. The highest rates of increase occurred in Hungary at 13 %, followed by Serbia and Croatia, with growth in each case of around 8 %. Strong sales growth in Hungary was also bolstered by the acquisition of the industrial gases activities of Air Liquide in Hungary with effect from June 1, 2016.

### **Central Europe**

Compared to the previous year, sales recorded for the Central Europe region were up by just under 5 % (or 3 % excluding exchange rate factors). In particular the excellent business climate in Poland, from which Messer's local activities benefited, and a good performance in Slovakia contributed to the increase.

The Group recorded an EBITDA of K€ 289,827 for the fiscal year 2017 (2016: K€ 249,057).

EBITDA	Jan. 1 - Dec. 31, 2017	Jan. 1 - Dec. 31, 2016
EBIT	139,080	107,026
Depreciation, amortization and impairment losses on intangible assets and property, plant and equipment	150,704	141,977
Dividend income <sup>1</sup>	43	54
<b>EBITDA</b>	<b>289,827</b>	<b>249,057</b>
Sales	1,231,847	1,145,790
Margin:	23.5%	21.7%

<sup>1</sup> Dividend income from non-consolidated companies

Contrary to our previous year's prediction, the Messer Group's EBITDA rose by 16 % year-on-year.

Overall the Messer Group recorded a group net profit (including profit attributable to minority interests) of K€ 83,663 for the fiscal year 2017 (2016: K€ 67,238). The gross profit amounted to K€ 557,510 (45.3 % of sales) and the operating profit amounted to K€ 139,080 (11.3 % of sales). Compared to the previous year, the operating profit increased by K€ 32,054.

The operating result includes a positive effect of K€ 5,113 from the reversal of impairment losses on property, plant and equipment and a negative effect of K€ 2,745 from the write-down of the ASCO brand. In addition, an impairment loss of K€ 15,339 was recorded in 2017 on goodwill.

In the previous year, the operating result was influenced by two offsetting factors. On the one hand, application of IFRIC 4 had a one-time positive impact on sales of € 6 million for newly commissioned plants, while on the other, impairment losses and reversals of impairment losses on property, plant and equipment had a net negative impact of K€ 4,400.

Profit before tax and minority interests is stated after a net interest expense of K€ 18,647, which represented an improvement of K€ 2,563 on the previous year due to the lower level of debt during the year. Other financial result for the year 2017 deteriorated by K€ 6,258 compared to the previous year, mainly reflecting negative changes in the fair value measurement of derivatives with income statement effect.

Taking into account all of the above factors, the group profit attributable to equity holders of the parent company totaled K€ 59,864 and was therefore K€ 8,186 higher than in the previous year.

### Financial position

Group Treasury is responsible for overall liquidity, interest rate and currency management. The most important objective of Group Treasury is to ensure that a minimum level of liquidity is always available to ensure solvency at all times. High levels of liquid funds help to improve our flexibility, security and independence. If necessary, we can call on additional liquidity potential under further various available credit lines amounting to € 54.3 million.

G4-9

## Financing

Net debt as of December 31, 2017 stood at K€ 290,139 (2016: K€ 379,335) and is broken down as follows:

Net debt	Dec. 31, 2017	Dec. 31, 2016	Change in 2017
Financial debt	481,463	526,661	
Currency hedge USPP	(15,310)	(33,342)	
<b>Gross financial debt</b>	<b>466,153</b>	493,319	
Cash and cash equivalents	(176,014)	(113,984)	
	<b>290,139</b>	379,335	23.5%

The Messer Group reduced net debt in 2017 by K€ 89,196 compared to the previous year. Based on financial liabilities of K€ 481,463 at the end of the reporting period, the ratio of financial debt to the balance sheet total was 21.8%.

### Cash flow statement

Abridged version in K€	Jan. 1. - Dec. 31, 2017	Jan. 1. - Dec. 31, 2016
Profit before taxes	<b>113,145</b>	89,093
Cash flows from operating activities	281,234	229,328
Cash flows from investing activities	(137,460)	(137,653)
Cash flows from financing activities	(78,235)	(127,457)
Changes in cash and cash equivalents	<b>(65,539)</b>	(35,782)
Cash and cash equivalents at the beginning of the period	<b>113,984</b>	144,504
Currency translation impact on cash and cash equivalents	(2,465)	5,262
Cash, change in group reporting entity	–	–
Cash classified as held for sale	(1,044)	–
<b>at the end of the period</b>	<b>176,014</b>	113,984

At K€ 281,234 the total of cash flows from operating activities was K€ 51,906 higher than in the previous year. In addition to the higher net profit for the year, this trend is also largely attributable to a decrease in finance lease receivables. These receivables fall within the scope of application of IAS 17 (in conjunction with IFRIC 4) and are reduced in line with customer payments.

The change in cash flows from investing activities again reflected the continued high level of investments by the Messer Group. The bulk of the outflows related to investments in property, plant and equipment. In addition, the acquisition of the shares in Universal Industrial Gas Sdn. Bhd, Malaysia, resulted in cash outflows relating to intangible assets.

Cash flows from financing activities amounting to K€ 78,235 were K€ 49,222 lower than for the previous fiscal year. After a scheduled increase in financial debt repayment in the previous year, outflows for repayments were somewhat lower in 2017. At the same time, cash holdings went up.



Liquid funds held by the Messer Group at December 31, 2017 totaled K€ 176,014, compared to K€ 113,984 one year earlier.

In 2018, the Messer Group will require further capital to fund its expanding business operations and scheduled capital expenditure and to repay loans and interest as they fall due, even though our focus in the medium term will be to consolidate net debt levels relating to operations outside China. These funds will be generated out of cash flows from operating activities, existing funds and credit lines available to the Group. The Messer Group's strong position in the various markets in which it already operates, combined with expansion into new markets, will enable us to maintain our robust financial position.

The Group has committed to purchase or to invest in the construction and maintenance of various production facilities. Obligations under these agreements represent commitments to purchase plant and equipment at market prices in the future. The Group is also party to long-term contracts which give rise to obligations. As of December 31, 2017, purchase and capital expenditure commitments and long-term contracts amounted to K€ 128,378 (2016: K€ 73,655).

### Capital expenditure

Capital expenditure continues to be focused on safeguarding existing business and opening up opportunities for growth. In accordance with normal business principles, the Messer Group invests primarily in projects which will secure supply capabilities and/or which create opportunities for profitable growth. Furthermore regular investments are made in the modernization of production plants and distribution channels.

The Messer Group's capital expenditure on property, plant and equipment and financial investments totaled € 144 million. The capital expenditure ratio corresponds to 11.7 % of sales. The principal investments during the fiscal year in property, plant and equipment were the construction of air separation plants in Vietnam, Slovenia and Hungary and production plants in China.

Overall, capital expenditure on property, plant and equipment totaled € 143 million in 2016, compared to € 119 million in 2016. Investments in financial assets related to the payment of the full purchase price for the acquisition of 60 % of the shares in Universal Industrial Gas Sdn. Bhd. in Malaysia (K€ 1,985). Furthermore the companies Messer (Thailand) Co., Ltd, Thailand, and Pt. Chemindo Inti Usaha, Indonesia, were established as part of our planned entry to the ASEAN region.

Capital expenditure by region was as follows:

Capital expenditure in K€	Jan. 1. - Dec. 31, 2017	Jan. 1. - Dec. 31, 2016
China, Vietnam, ASEAN and Peru	47,017	39,972
Western Europe	40,465	41,563
South-Eastern Europe	38,459	44,528
Central Europe	18,291	17,473
	<b>144,232</b>	<b>143,536</b>

In China, Messer's investment projects are focused on pushing ahead with the strategy of customer diversification compared to the existing business model. This includes a gas supply system for high-purity

industrial gases for an on-site customer from the electronics industry in Sichuan province, the pipeline connection of customers in a chemical industrial park in Chongqing province and a semi-automated filling plant in Hunan province.

In Vietnam, construction work started on the fourth air separation plant for on-site customer Hoa Phat at its production site to the east of Hanoi and two further air separation plants for its new steelworks in the center of the country in Dung Quat.

Capital expenditure in Europe remains focused on investment in distribution channels and selected growth projects. The selected growth projects include the completion of the project to expand the existing air gas and CO<sub>2</sub> production capacities in Hungary, the construction of the first air separation plant in Slovenia, which ensures future supply independence of our industrial gas activities there, the construction of a first CO<sub>2</sub> production plant in Bulgaria and the expansion of the CO<sub>2</sub> production capacities in Bosnia. In addition, we invested in the selective expansion and/or modernization of filling plants in Germany, Poland and the Netherlands, and the takeover of an industrial gas trading business in Warsaw, Poland.

#### G4-9 Net assets

The balance sheet total at December 31, 2017 amounted to K€ 2,206,026, of which the largest proportion (76.8 %) related to non-current assets (2016: 79.2 %). Tangible and intangible assets represented the largest combined item on the assets side of the balance sheet (67.3 %). The carrying amount of these two items together increased by K€ 40,688. Non-current lease receivables and cash at banks account for 6.2 % and 8.0 % respectively of total assets.

Currency factors (including amounts attributable to minority interests) had the effect of decreasing the balance sheet total by K€ 33,875 and were attributable mainly to our Chinese and Serbian companies.

The equity ratio (including minority interests) increased to 61.0 % (2016: 59.3 %). Gross debt accounted for 21.8 % of the balance sheet total and decreased by K€ 45,198 compared to one year earlier. The refinancing concluded in 2015 and debt repayment in 2017 led to further improvement of the financing structure in terms of the long-term financing of assets.

#### Cost of capital percentage for employed capital

The ROCE for the past year was 10.71 %, calculated as follows:

ROCE	Jan. 1. - Dec. 31, 2017	Jan. 1. - Dec. 31, 2016
EBIT	139,080	107,026
+ Amortization of goodwill	15,339	–
<b>EBIT adjusted</b>	<b>154,419</b>	107,026
: Capital employed	1,441,300	1,481,264
<b>ROCE in %</b>	<b>10.71 %</b>	7.23 %
<b>Derivation of capital employed from the balance sheet</b>		
Other intangible assets and property, plant and equipment	1,185,421	1,207,758
Finance lease receivables	151,447	173,509
Net working capital	104,432	99,997
<b>Capital Employed</b>	<b>1,441,300</b>	1,481,264

## Operating assets

Net working capital stood at K€ 104,432 at the end of the reporting period (2016: K€ 99,997) and comprised the following:

Net working capital	Dec. 31, 2017	Dec. 31, 2016
Inventories	58,939	54,158
Trade accounts receivable	191,809	206,561
Trade accounts payables	(130,165)	(145,706)
Advance payments received	(16,151)	(15,016)
	<b>104,432</b>	<b>99,997</b>

The increase in net working capital compared to the previous year is largely attributable to the higher level of inventories. The K€ 4,781 increase in inventories was mainly in the area of work in progress in conjunction with customer projects involving our companies in Germany.

The ratio of inventories less advance payments from customers plus receivables on the one hand and trade payables on the other was, as in the previous year, approximately 2:1; the ratio of net working capital to sales went down from 8.7 % to 8.4 %.

DSO (Days Sales Outstanding) decreased by nine days from 65 to 56 days. The decrease in DSO related in particular to China and Switzerland and was attributable to improvements in the management of receivables and the conduct of our customers with regard to payments.

## Overall statement on the Group's financial condition

Benefiting from an almost ideal economic climate, sales of the Messer Group rose by 7.5 % year-on-year. Our business activities in Asia – and first and foremost in China – made a strong contribution to this result.

The EBITDA margin improved sharply to 23.5 %, while EBITDA surged from approximately € 249 million to € 290 million.

The Messer Group's return on capital employed (ROCE) improved to 10.71 % (2016: 7.23 %). Instead of the sharp decline in ROCE forecasted for 2017, ROCE actually increased significantly, which was attributable to the unexpectedly and extraordinarily favorable economic trend for our business in China.

Good progress was also made in consolidating net debt levels relating to our operations outside China, which forms the focus of our medium-term planning. In 2017, for instance, net debt relating to our operations outside China relevant for the net debt covenants was reduced year-on-year by a further € 23.8 million to € 306.7 million. This trend is also reflected in the total net debt figure of approximately € 290 million for the Messer Group, which was down by a further € 89 million compared to the end of the previous year.

These overall very favorable developments represent good progress and are testimony to the stability and sustainability of the Group's business model. The Messer Group, operating in the two principal regions of Europe and China, has a global presence and good regional diversification in a number of countries or provinces within the two principal regions, so that falling demand in individual markets or downturns in specific sectors can often be offset.

# Outlook

## Macroeconomic and sector-specific risks

Economic growth in 2017 significantly exceeded predictions in many areas and was virtually synchronous worldwide. As a result of these developments, some leading economic institutes now believe that the global economy has reached its growth potential and that it will now enter a phase of stabilization. For example, the World Bank<sup>1</sup> is only predicting a marginal acceleration in the global GDP rate from 3.0 % in 2017 to 3.1 % in 2018. The OECD<sup>2</sup> prediction for global economic growth is similar, with GDP now expected to grow at 3.7 % in 2018 compared to 3.6 % in 2017. This relatively stable global economic development, which is expected to last until 2019/20, is based mainly on the favorable financing conditions worldwide which, together with evenly-balanced and stable commodities prices, ultimately promotes investment and raises the underlying sentiment of most businesses. At the same time, it is becoming clear that assumptions also need to take account of a potential slowdown of the world economy due to factors such as the ageing global population and declining productivity gains. For 2018, both the World Bank and the IWF<sup>3</sup> forecast that the developed industrialized countries will continue to grow at a similar rate to the previous year and that the emerging and developing countries will achieve another slight increase. The IMF forecasts GDP-growth of 2.3 % in 2018 (2017: 2.3 %) for the developed industrialized countries as a whole. However, a general slowdown in economic growth is already expected within the individual industrialized countries, which will be offset only by a further significant increase in US GDP-growth to 2.7 % in 2018 compared to 2.3 % in 2017. For the emerging and developing countries, with GDP-growth forecast to rise to 4.9 % in 2018 (2017: 4.7 %), economic growth is gradually expected to peak. In China, on the other hand, the ongoing process of change embarked upon with a view to strengthening domestic demand on the basis of consumption and services is expected to result in a return to the trend towards a decelerating growth rate. The IMF and World Bank forecast GDP growth rates for 2018 of between 6.6 % and 6.4 %.

The World Bank and the IWF again point out clear forecasting risks in their pronouncements for 2018, which arise primarily from a sudden change in the favorable financing conditions and disruptions on the global financial markets.

## Outlook for the Messer Group

The Messer Group's net financial debt to EBITDA ratio stood at 1.0 at December 31, 2017, whilst the corresponding ratio for our operations excluding China was 1.8. The medium-term forecast for the Messer Group continues to show lower net debt levels for our business activities outside China. By investing on a sound basis, we also intend to raise sales at a pace appropriate for the prevailing economic conditions and to take advantage of selected opportunities in order to stabilize or improve the profitability of the Messer Group.

<sup>1</sup> Global Economic Prospects, January 2018

<sup>2</sup> OECD Economic Outlook – No. 102, Update November 2017

<sup>3</sup> World Economic Outlook, Update January 22, 2018



We continue to view economic prospects in Europe with cautious optimism, although regional pressure on prices and intense competition and a re-emergence of the crisis in the steel industry or a potential financial crisis could hold down growth. The main focus of our business performance in Europe is on exploiting new production capacities created in recent years (in particular in Germany, France, Austria, Poland and Spain) to the maximum extent, and successfully creating new production capacities and customer projects at selected locations (e.g. in Serbia, Slovenia and Hungary). Future investment decisions will be taken in line with the stated strategy of consolidating net debt levels in the medium term.

The China region accounted for approximately a third of sales and more than 40 % of the EBITDA of the Messer Group in 2017. The net debt/ EBITDA ratio for the China region was negative 0.15. This means that cash funds exceeded financial debt by € 17.6 million, underlining the continuing importance of Chinese operations for sales, profitability and internal financing of the Messer Group.

We remain confident in our prediction that the market in which we intend to participate on a broad basis will continue to grow at an above-average rate. Accordingly, the process of diversifying the sales profile in China will be continued. In this respect, we have reached an advanced stage in the implementation of a comprehensive package of measures. These measures include concentrating on new business in non-steel sectors, the development of applications technology for the liquefied gases business and the expansion of the specialty gases and CO<sub>2</sub> business.

According to the current estimates of the various economic research institutes, we expect energy costs, which are all-important for our industry, not to rise disproportionately for the time being.

The main financial performance indicators for the Messer Group are forecast to develop as follows in the coming year:

	2018 compared to 2017
Sales	Moderately decreasing
EBITDA	Sharply decreasing
Investments	Sharply rising
Net debt	Sharply rising
ROCE	Sharply decreasing

## Overall assessment by management

In view of the inherent uncertainties, the Messer Group draws up its forecasts on a prudent basis. The budget for 2018 was prepared before the fourth quarter 2017, which was highly successful due to a strong performance, particularly in China. With the benefit of hindsight, the expectations built in the budget for 2018 are therefore cautious in terms of forecast sales, EBITDA and ROCE. On the basis of the results for the first two months of the fiscal year 2018, we now expect the positive trend of 2017 to continue in China in the fiscal year 2018 too.

We drew up the budget on the assumption that the new financial year 2018 would reflect a continuation of the economic recovery phase across Europe, albeit at a decelerating pace. In China, the growth rate is likely to return to decelerating trend. Global economic conditions are currently positive despite the continued

existence of some significant risks which create major challenges in accurately assessing future economic developments. Risks and uncertainties which may impact on economic conditions that are relevant for the Messer Group's business are seen primarily in possible upheavals in the wake of expected changes in monetary policies, the uncertain outcome of the continued transformation of the Chinese economy, the still incalculable impact of "Brexit" and a potential trade war. This will continue to be accompanied by the unforeseeable stresses and strains from the trouble spots, especially in the North African and Arabian region.

The Messer Group considers that it is well placed to meet the forthcoming challenges – although it continues to deem it wise to adopt a prudent stance with regard to short-term expectations. The budgeted decrease in sales is mainly attributable to the assumption that the growth rate in China will normalize again compared with 2017 and that the euro will become stronger as a currency for transactions. The predicted deterioration in EBITDA and ROCE reflects the expected decline in sales, compounded by a less favorable forecast of other operating items.

Future investment decisions will be taken in line with the stated strategy of consolidating net debt levels for existing operations in the medium term. A commensurate level of Investments appropriate to this objective is planned for 2018 to take advantage of opportunities arising in China, Vietnam and ASEAN. A solid earnings performance is expected to successfully counteract any sustained increase in net debt at the Messer Group.

## Forward-looking assertions

The Outlook Report contains forward-looking assertions which are based on the management's current appraisal of future developments. These assertions are not to be interpreted as a guarantee that these expectations will in fact be met. Future business performance and earnings of the Messer Group are dependent upon a number of risks and uncertainties and may therefore diverge significantly from the forward-looking assertions made here.

# Opportunities report

As an international supplier of industrial gases, opportunities basically arise for the Messer Group from the multifarious usages of industrial gases to produce products needed in all fields of life and in all countries of the world. Through investment, we are able to exploit available opportunities to realize the full potential of the business and to maintain/ strengthen our market position. We are also taking advantage of the opportunities arising from internationalization – in particular in the light of positive developments on the emerging economies – by expanding our facilities in these regions. This also enables us to engage in new markets with long-term growth potential. We encourage the identification of new opportunities by embedding employee motivation in the Group's corporate values and by fostering ideas management.

The main opportunities which could be significant for the net assets, financial and earnings position of the Messer Group are as follows:

## Macroeconomic opportunities

The general economic environment plays an important role for our operations, our financial and earnings position and our cash flows. Our forecast for 2018 is based on the expectation that future macroeconomic conditions correspond to the description provided in the Outlook Report section of the management report. If the world economy as a whole or in regions or countries of relevance for our business performs better than described, our sales and earnings could exceed the forecasted amounts.

## Market opportunities

Our forecasts continue to incorporate continued significant market growth, particularly in China, but, for the purposes of the outlook for 2018, have not assumed any further increase in the growth rate. A sharp economic upswing could have a positive impact on the Group's sales and earnings.

We forecast a modest economic recovery in Europe. A faster economic recovery, especially in the southern European countries of the euro area, could have a positive impact on our sales and earnings.

## Opportunities arising from industrial gases applications

Our products are used worldwide in a variety of production processes. In the field of application technology, the Messer Group continuously analyzes multifarious processes in order to facilitate more efficient production processes for our customers through the use of industrial gases. New applications identified in this way may open up new business opportunities which could have a positive impact on our sales and earnings.

## Opportunities arising from optimization measures

Where necessary, the Messer Group implements appropriate optimization measures to support business performance. If the various measures are implemented more quickly or more successfully than expected, this could have a positive impact on our sales and earnings.

## Opportunities created by our employees

The Messer Group promotes „ideas management“ throughout the group and employees are encouraged to submit improvement proposals with local and/or international relevance. Furthermore, human resources development programs and other training offers are available to encourage the systematic development and exploitation of our employees' potential. If we achieve better progress with these measures and methods than currently expected, this could have a positive impact on our sales and earnings.

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# Risk report

As an international supplier of industrial gases, the Messer Group is exposed to opportunities and risks which inevitably arise in connection with entrepreneurial activities. Moreover, future earnings will depend both on the operating performance of the gases business and on the state of the economies in individual countries, a factor over which the Messer Group has no influence. It is the task of all concerned to take advantage of opportunities when they arise, whilst at the same time ensuring that risk is kept to a minimum and pro-actively managed.

The main risks which could be significant for the net assets, financial and earnings position of the Messer Group are as follows:

## Macroeconomic risks

The industrial gases business is subject to intense competition. The level of competition is increasing in conjunction with the process of globalization. This highly competitive environment could reduce Messer's earnings and cash flows in the future. The Messer Group operates globally, making it susceptible to local political, social and economic conditions and to the resulting risks arising in each market.

## Market risks

We supply a cross-selection of industries and sectors (including steel, metal processing, chemicals, petrochemicals, food and beverages, healthcare and glass) on the basis of long-term contracts over periods of up to 15 years in Europe and up to 30 years in Asia. A significant reduction in market demand in any one of these key industries or sectors – particularly given the prevailing critical situation in the steel industry which



is suffering from worldwide over-capacity – could adversely affect future earnings. Our strong position in China also means that this region makes an above-average contribution to earnings, and conversely, that any economic downturn on this market cannot be fully compensated by improved performance in other markets.

## Cost risks

Regulatory or government amendments or interventions in the energy sector may lead to rising energy prices in some countries. The re-occurrence of crisis situations within oil-producing countries, the growing demand for energy in emerging economies, particularly in China and India, give reason to believe that oil and energy prices will rise again in the long term with a corresponding impact on supplies and primary products necessary for the Messer Group's business. Purchase prices of some important bought-in products, such as helium, fluctuate considerably. Although Messer is often able to pass on cost increases partially to its customers via price escalation clauses in supply contracts (in particular for electricity price increases) or reduce the risk by entering into long-term purchase agreements, it is possible that price increases for energy and bought-in items could adversely affect the profitability of the Messer Group.

## Selling price risks

The intense competition may lead in certain countries to disproportionate downward price trends, which could have a negative impact on future sales and earnings. The integration of member states which have only recently joined the EU entails risk in that many previously state-run businesses will need to be privatized and restructured in accordance with EU and International Monetary Fund requirements. The number and scale of state grants could be drastically reduced, culminating in numerous closures and mergers in these countries, and an adverse impact on the Group's sales. In these circumstances, the downward pressure on selling prices would probably increase.

## Operational risk

An operational interruption at one of our production facilities can result in loss of supplies to customers. We endeavor to avoid this situation by regularly maintaining and monitoring our equipment. In the event of breakdowns or defects, emergency plans and instruments are in place to reduce the financial consequences of a business interruption at one of our customers. The Messer Group is currently expanding its supply structure and maximizing flexibility in order to ensure that supplies to customers are safeguarded even in emergency situations. The range and quality of our products depend on the availability of bought-in hardware and on the production equipment used (e.g. cylinders and tanks) on the one hand and on the quality of service/products of our suppliers and business partners on the other.

## Acquisition risks

The Messer Group is continually developing new strategies. As well as expanding and strengthening our existing business and continually optimizing our sourcing and logistics processes, we are intent on achieving growth both organically and through other means such as acquisitions and joint ventures. Our aim is to consolidate operations on existing markets and to divest non-core business operations. The sale of entities or business activities can, however, result in retrospective risks for the Group. Appropriate provision is recognized if a risk is probable. When deciding to make acquisitions or entering into new partnerships there is always a risk that future market potential and the feasibility of projects being put into action may have been wrongly predicted. The Messer Group therefore has internal committees which highlight the development potential of a project prior to its approval and analyze any information which has a bearing on decisions which need to be made. In order to be as certain as possible that M&A projects have future development potential, due diligence investigations are carried out by experienced staff in specialist departments before any acquisitions are made in connection with M&A projects. Risk is also reduced by including relevant terms of agreement in sales contracts.

## IT risks

The use of state-of-the-art information technology plays a decisive role in handling and securing business processes within the Messer Group. Our IT center in Germany provides the scope to create a modern and efficient infrastructure and to improve our business processes where necessary. This concentration does, however, mean that there is a greater risk of business interruption, cyber criminality and sabotage, caused by natural hazards or human error. In order to avoid this risk, our IT center applies its own IT risk management system, including ongoing testing of the system architecture. Particular attention is paid to the provision of IT infrastructure and services and especially to guaranteeing fail-safe and interference-free operations. The integrity and reliability of the data and important information are ensured by means of appropriate measures, services and systems. Most of the business processes of the Messer Group are provided by internal or external IT services. The security and compliance of the information systems are set out in the IT strategy objectives, on the basis of which the Messer Group designs, implements and reviews measures to ensure protection of data, applications, systems and networks on an ongoing basis. Both preventive and corrective measures are considered in this process.

## Financing risks

We require funding to finance our growth and ambitious capital expenditure program. We are therefore dependent on the financial sector remaining stable and liquid. The Messer Group is reliant on cash flows from operating activities to repay debt. This is dependent to a large extent on the ability to generate positive cash flows from operating activities.

The Group has recognized goodwill in the consolidated balance sheet. The application of IAS 36 (i.e. the performance of impairment tests) could result in the requirement to recognize impairment losses on goodwill, if the business and market prospects of a group subsidiary or cash-generating unit deteriorate

compared to the original date of measurement. Impairment losses could have a significant adverse impact on earnings and on balance sheet/ performance ratios. In China, the steel industry is in a State-run restructuring process which may lead to the closure of individual production sites. The resulting uncertainties were taken into account in the forecast through corresponding allowances on receivables and scaled-back business assumptions.

There is always a risk that financial and debt crises could result in global economic downturns or slowdowns. The Messer Group will continue to observe developments very closely. Cost reduction measures and capital expenditure programs initiated and implemented in recent years have helped to counter the negative impact of previous financial and economic crises. Many of these programs remain in place. A potential deterioration in the creditworthiness of our customers increases the risk of bad debts and delays in joint projects.

It is essential that we ensure compliance with the covenants attached to the USPP and RFA financing arrangements. Particularly worthy of mention is the net debt (i.e. gross debt less liquid funds)/EBITDA covenant which is required to be complied with for the Messer Group as a whole and for the Messer Group excluding its subsidiaries in China. Financial risks can also arise for the Messer Group from changes in exchange and interest rates. The management of interest rate, currency and liquidity risks is handled by Group Treasury in compliance with guidelines approved by executive management. Group Treasury identifies, measures and hedges financial risks. The Messer Group currently employs marketable forward currency contracts, interest rate swaps and cross-currency interest rate swaps as hedging instruments. Treasury guidelines contain general risk management principles and specific rules for defined areas such as the exchange rate risk, interest rate risk, the use of derivative financial instruments and the investment of surplus cash. The related risks are observed continuously and the scope of hedging adjusted where considered necessary.

## Currency risks

Transaction risks arising in conjunction with the export of products are generally hedged as soon as the order is received. At an operating level, for the most part the individual Group entities transact their business locally in their functional currency. For this reason, the currency risk element of transaction risks is generally considered to be low. However, some Group entities are exposed to foreign currency risks that arise on transactions that are not denominated in their functional currency. These transactions relate mainly to payments for imported products or services and are hedged to the maximum extent possible. Like any other market participant, we may be confronted with the unexpected appreciation of a functional currency which weakens the international competitiveness of the country concerned and hence the ability of our local business to export its products. Translation risks which may arise when converting foreign currency exposures into euro are classified as customary for the business. Assets and liabilities denominated in non-euro currencies can give rise to exchange losses when converted into euros, thereby reducing Group equity.

## Legal and contractual risks

Enterprises are confronted from time to time with allegations that they have infringed industrial rights or legal obligations, that defective products have been supplied or that environmental protection laws have not been adhered to. Regardless of their prospects of success, this type of claim can result in very high defense costs. In cases like these, the Messer Group defends itself energetically with the support of both in-house and external experts.

Our international operations are subject to a wide range of country-specific environmental legislation and regulations in areas such as gas emissions, groundwater pollution, the use and treatment of dangerous substances as well as ground surveys and decontamination. This can give rise to liability risks in conjunction with either past or current operations. New environmental requirements, partially resulting from the adoption of EU directives in the new EU Member States, necessitate that our existing environmental standards (which are already at a very high level) are brought into line with the new requirements. This may result in higher production costs and modifications to the production process. That said, the recent past shows that the implementation of stricter environmental regulations often results in a more efficient production process and a higher quality product.

## Overall assessment by management

The above-mentioned opportunities show that both internal and external potential are involved. We endeavor to develop in-house potential on a targeted basis and will put external potential to good use whenever the opportunity arises. The risks presented above are not the only ones to which the Messer Group is exposed. Some risks, which have not yet been identified or which are not considered to be significant from today's perspective could have an adverse impact on the Messer Group if general business or economic conditions were to change. However, no risks were identified in 2017, either individually or in aggregate, which could have a material adverse impact on the going-concern status of the Messer Group. From today's perspective, no such risks are pending in the foreseeable future. The principal risks during the period under report encompassed market developments, with at times intensive competition and price pressure, as currently in China, and production processes. Organizational measures are in place to identify potential risks at an early stage. Our vigilant risk management system (described below) and pro-active management of risks enable us to reduce risk.



# Risk management

The principles that dictate our approach to risk management are stipulated by the Executive Management. Risk management is directed at safeguarding the going-concern status of group entities and increasing the value of the business; for this reason it plays a crucial role in all decision-making and business processes. The existing management structure and the reporting processes which are in place ensure that not only developments that could jeopardize its going-concern status are reported regularly and in good time to the relevant levels, but also that other developments which pose a threat to the achievement of short-term performance targets (such as EBITDA or cash flow) are reported. This allows management to initiate measures at an early stage to mitigate any business and/or financial risks. Risk managers have been designated at each of the subsidiaries with responsibility for ensuring the proper functioning of local reporting systems. Working together with local risk managers, the group risk manager prepares a risk report for the Messer Group as a whole at the start of each year which is discussed by the Executive Management and communicated to the Supervisory Board of the Messer Group in good time. The risks recorded in the risk report are categorized by nature and classified by probability of occurrence. Risk perception in the current selling environment has exacerbated the risk profile of Messer Group entities in the fiscal year 2017 compared to the previous year.

Messer is adequately insured against potential claims or liability risks, to which it is exposed; these policies ensure that the financial impact can be kept within defined limits or completely avoided. The scale of insurance coverage is continuously optimized in response to the specific situation of group companies.

The Messer Group's internal audit department carried out twelve status audits (all follow-up audits) at European Messer Group companies during 2017. In China, the local central organization carried out internal audits during the year (most of them relating to tax matters) and some status audits. The regular follow-up audits (in total eleven audits), which check at appropriate intervals that the previous findings and recommendations have been implemented effectively, are still considered to be a core aspect of the internal audit department's activities. The audits by the internal audit department at the same time include advisory activities in the sense that information on best practice is passed on and cross-border assistance is organized; this takes account of the respective current standards of the entities in the various countries. In addition, a regular exchange of information takes place with the external auditors in order to make the best use of available know-how, on a results-oriented basis, during the respective audits. Where necessary, other central functions are also called upon in an advisory capacity (including SHEQ, Corporate Logistics, Central Sales Functions). Compliance with corporate guidelines is tested and sample testing of voucher/document controls performed within the various business processes, in order to check the effectiveness and commercial sense of processes as well as the accuracy and reliability of financial reporting. Findings were clarified and recommendations made to improve the transparency of business processes. The Supervisory Board of the Messer Group regularly reviews the quality and appropriate intensity of the audits.

The Group's Safety, Health, Environment, Quality (SHEQ) department continues to carry out audits and risk analyses in order to reduce the accident ratio even further.

State-of-the-art technologies are employed in the IT area in order to keep the risk from electronic data processing to a minimum. Unauthorized access to data and systems and a significant loss of data are ruled out

to the greatest extent possible. The efficiency, operational availability and reliability of systems are constantly being monitored and improved. Messer's security concept also includes a detailed emergency plan. In order to minimize risks, the various technologies employed by the Messer Group are regularly tested to ensure that IT-based business processes are safe.

Tax laws and competition regulations can also give rise to business risks. In order to mitigate these risks, the Company relies upon the advice of both in-house and external experts.

Income and operating cash flows are, to a large extent, unrelated to market interest rates, since the Group does not hold any significant interest-bearing assets. Loans or credits subject to variable interest rates are hedged partly with the aid of interest rate swaps (cash flow hedges of future interest payments). Under these arrangements, loans with variable interest rates are converted in substance to ones with fixed or maximum rates. In conjunction with the interest rate swaps, the difference between fixed contract interest rates and variable interest rates is settled at specified intervals (computed by reference to an agreed amount). At the balance sheet date, derivative financial instruments had only been entered into with renowned international financial institutions.

Corporate Governance within the Messer Group includes a whole range of in-house rules and measures aimed at preventing the occurrence of risks. The first stage of the risk management system is to assess risks throughout the organization. This risk assessment is conducted by the Group's corporate departments for the respective areas of responsibility and by each consolidated subsidiary for its own business. The assessment of risks is updated each year. All information relating to risks is collated centrally by the Corporate Compliance Officer (CCO). Training is organized and carried out as appropriate to cover identified risk areas and to highlight best practice for avoiding the occurrence of a risk as far as possible. Mandatory compliance guidelines are in place for all Messer Group entities, including in particular the „Code of Conduct“ and „Group Guidelines“. All first and second-tier managers of the Messer Group and its consolidated subsidiaries have confirmed that they have received these guidelines, examined their content and comply with the regulations contained therein. Furthermore, all employees have been informed of the content of compliance guidelines of relevance to them and have also confirmed compliance with them. Management and staff are regularly informed about, and receive training on, the content of these guidelines, other policies and code of conduct rules.

On the basis of a matrix structure, the Compliance department cooperates closely with the SHEQ, Medical, IT, Audit, Legal and Insurance departments. Internal audits are carried out to check that compliance guidelines – in particular the Group Guidelines – have been appropriately implemented, thus ensuring good risk management procedures throughout the organization, including conduct and reporting rules, the requirement for approval at the appropriate level as well as application of the dual control principle for legally binding agreements with third parties. Incidences of non-compliance are followed up and the appropriate actions taken where necessary. At the same time, any such incidences are used to reflect on how additional preventive measures could reduce the risk of non-compliance in the future.

Bad Soden am Taunus, March 1, 2018

Messer Group GmbH



# Consolidated Balance Sheet

of Messer Group GmbH, Sulzbach/Taunus, as at December 31, 2017 (in K€)

		Dec. 31, 2017	Dec. 31, 2016
Assets	Intangible assets	386,491	411,727
	Property, plant and equipment	1,099,201	1,114,653
	Investments accounted for using the equity method	50,124	53,280
	Investments in other companies and financial investments	4,150	6,186
	Deferred tax assets	16,310	14,830
	Other non-current receivables and assets	138,147	160,123
	<b>Non-current assets</b>	<b>1,694,423</b>	<b>1,760,799</b>
	Inventories	58,939	54,158
	Trade receivables	191,809	206,561
	Income tax assets	1,992	4,833
	Other receivables and other assets	69,004	83,212
	Cash and cash equivalents	176,014	113,984
	<b>Current assets</b>	<b>497,758</b>	<b>462,748</b>
<b>Non-current assets held for sale</b>	<b>13,845</b>	<b>–</b>	
<b>Total assets</b>	<b>2,206,026</b>	<b>2,223,547</b>	
Equity and Liabilities	Share capital	100,000	100,000
	Capital reserve	536,937	541,937
	Other reserves	45	45
	Revenue reserves	537,561	476,316
	Other components of equity	17,637	43,097
	<b>Equity attributable to shareholders of the parent company</b>	<b>1,192,180</b>	<b>1,161,395</b>
	<b>Non-controlling interests</b>	<b>152,734</b>	<b>156,515</b>
	<b>Equity</b>	<b>1,344,914</b>	<b>1,317,910</b>
	Provisions for employee benefits	55,758	56,857
	Other provisions	7,091	5,017
	Non-current financial debt	419,634	467,174
	Deferred tax liabilities	30,780	33,164
	<b>Non-current liabilities</b>	<b>513,263</b>	<b>562,212</b>
	Other provisions	30,943	24,824
	Current financial debt	61,829	59,487
	Trade payables	130,165	145,706
	Income tax liabilities	14,176	7,518
	Other current liabilities	107,947	105,890
	<b>Current liabilities</b>	<b>345,060</b>	<b>343,425</b>
	<b>Non-current liabilities held for sale</b>	<b>2,789</b>	<b>–</b>
<b>Total equity and liabilities</b>	<b>2,206,026</b>	<b>2,223,547</b>	



# Consolidated Income Statement

of Messer Group GmbH, Sulzbach/Taunus, for the Year Ended December 31, 2017 (in K€)

	Jan. 1 - Dec. 31, 2017	Jan. 1 - Dec. 31, 2016
Net sales	1,231,847	1,145,790
Cost of sales	(674,337)	(667,354)
<b>Gross profit</b>	<b>557,510</b>	<b>478,436</b>
Distribution and selling expenses	(310,123)	(287,363)
General administrative expenses	(106,599)	(98,782)
Other operating income	20,714	20,280
Other operating expenses	(7,083)	(5,545)
Impairment losses on goodwill	(15,339)	-
<b>Operating profit</b>	<b>139,080</b>	<b>107,026</b>
Income from investments accounted for using the equity method	(2,774)	1,479
Other investment results, net	(19)	35
Interest income	1,198	1,163
Interest expense	(19,845)	(22,373)
Other financial result, net	(4,495)	1,763
<b>Financial result, net</b>	<b>(25,935)</b>	<b>(17,933)</b>
<b>Group profit before tax</b>	<b>113,145</b>	<b>89,093</b>
Income taxes	(29,482)	(21,855)
<b>Group net profit for the year</b>	<b>83,663</b>	<b>67,238</b>
Of which attributable to:		
shareholders of the parent company	59,864	51,678
minority shareholders	23,799	15,560

# Consolidated Cash Flow Statement

of Messer Group GmbH, Sulzbach/Taunus, for the Financial Year 2017 (in K€)

	Jan. 1 – Dec. 31, 2017	Jan. 1 – Dec. 31, 2016
<b>Group profit before tax</b>	<b>113,145</b>	<b>89,093</b>
Income taxes paid	(24,121)	(24,086)
Depreciation and amortization of property, plant and equipment and intangible assets	150,704	141,977
Impairment losses on non-current financial assets	18	–
Loss / (gains) on disposals of fixed assets	(57)	(1,450)
Changes in investments in associated companies	2,773	(1,479)
Interest result, net	18,647	21,210
Other non-cash financial result	9,664	(1,763)
Changes in assets resulting from finance lease arrangements (IFRIC 4)	22,062	14,453
Changes in inventories	(7,664)	1,767
Changes in receivables and other assets	(7,827)	(26,750)
Changes in provisions	9,475	841
Changes in trade payables and other liabilities	(5,585)	15,515
<b>Cash flows from operating activities</b>	<b>281,234</b>	<b>229,328</b>
Purchase of property, plant and equipment and intangible assets	(142,264)	(118,798)
Purchase of investments and other non-current assets	(46)	(3,919)
Sale/(acquisition) of shares of other shareholders	–	–
Capital reductions at the level of associated companies	449	2,000
Disbursements for the acquisition of subsidiaries	(1,566)	(21,703)
Proceeds from disposals of property, plant and equipment and intangible assets	2,944	2,960
Proceeds from disposals of subsidiaries and loans	1,817	650
Interest received	1,206	1,157
<b>Cash flows from investing activities</b>	<b>(137,460)</b>	<b>(137,653)</b>
Changes in capital by shareholders of Messer Group GmbH	(5,000)	(11,958)
Proceeds from non-current financial debt	18,712	4,065
Proceeds from current financial debt	15,791	6,207
Repayments of non-current financial debt	(4,158)	(4,915)
Repayments of current financial debt	(53,133)	(65,650)
Dividends paid to minority shareholders	(20,759)	(23,974)
Acquisition of shares of other shareholders	–	(2,833)
Interest paid	(19,509)	(22,823)
Other financial result, net	(10,179)	(5,576)
<b>Cash flows from financing activities</b>	<b>(78,235)</b>	<b>(127,457)</b>
<b>Changes in cash and cash equivalents</b>	<b>65,539</b>	<b>(35,782)</b>
Cash and cash equivalents		
at the beginning of the period	<b>113,984</b>	<b>144,504</b>
Exchange rate impact on cash and cash equivalents	(2,465)	5,262
Cash classified as held for sale	(1,044)	–
at the end of the period	<b>176,014</b>	<b>113,984</b>



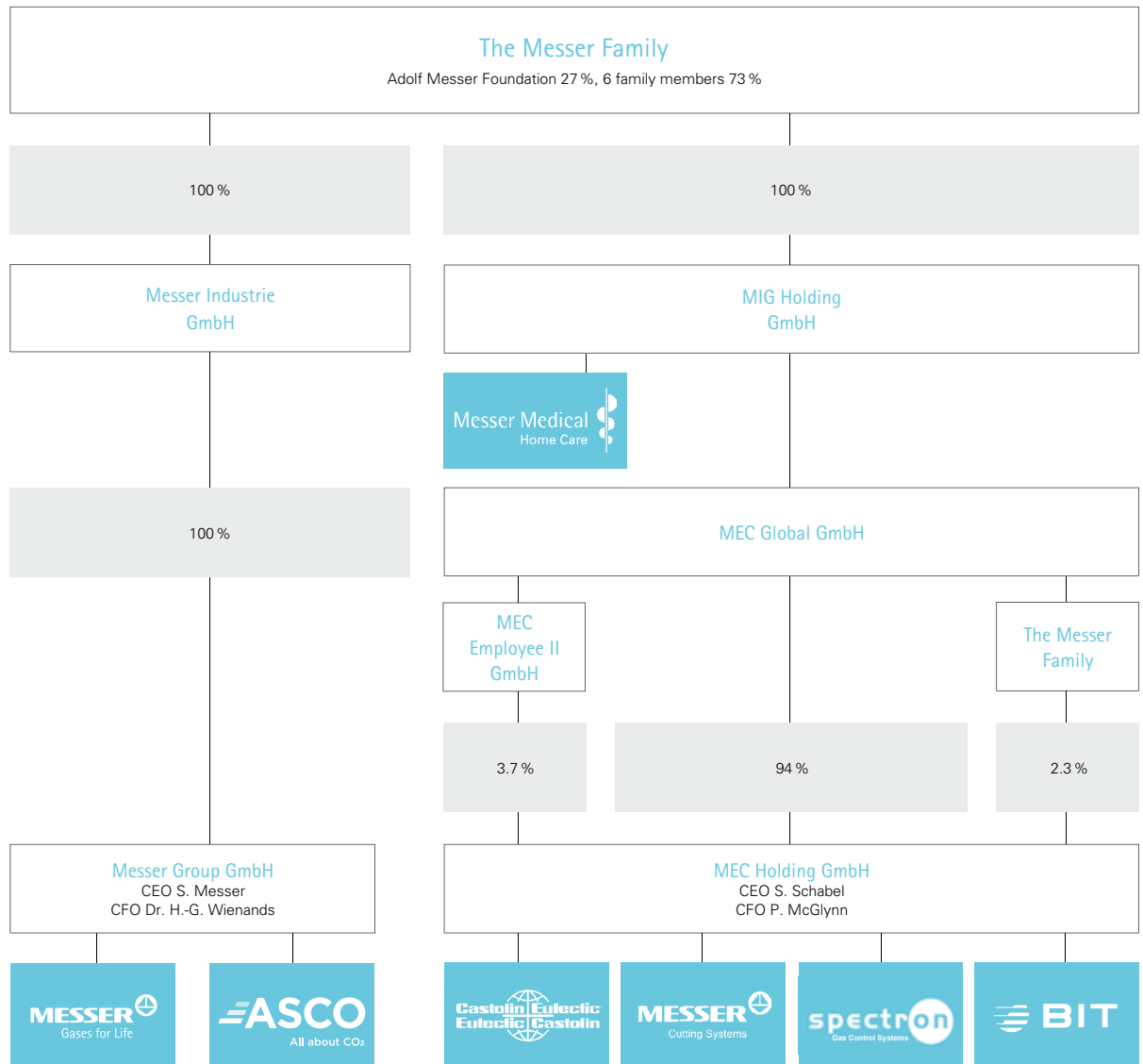
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# Messer World

Along with Messer Group and ASCO Carbon Dioxide, "Part of the Messer World" also includes the business areas of the sister companies Messer Cutting Systems, Castolin Eutectic, BIT and Spectron Gas Control Systems – as well as Messer Medical Home Care.

They all offer application-specific expertise and products which help optimise manufacturing processes, extend the life of production equipment and materials, or significantly enhance quality.

## Organisational structure



## ASCO CARBON DIOXIDE LTD

### Technology innovation and establishment in the US market

In 2017, the Swiss company ASCO launched a new generation of dry ice blasting machines: The ASCO Nanojet is small and handy and was specially developed for the plastics industry. For the new dry ice blasting machine, the engineering team at ASCO has integrated a pellet grinder into the machine body which crushes the dry ice pellets into finest dry ice particles. With the ASCO Nanojet, much smaller pellets are blasted on the surface being cleaned. This ensures a precise, fast and consistent surface cleaning. In addition, the US subsidiary ASCO Inc., which was founded in 2016 and is headquartered in Jacksonville, Florida, successfully established itself in the US market. Continuing to provide optimal on-site customer care and rapid availability of dry ice machines to US customers, ASCO Inc.'s staff structure has been further strengthened. Also, ASCO was able to gain Kryo Africa as a qualified service partner for repair and maintenance work in Africa. Thanks to the expanded service network, a flexible and fast on-site customer support in the English-speaking African countries can be ensured.

### Positive outlook

ASCO is going to continue with the ongoing optimisation of the product portfolio in the coming years. Especially in the field of CO<sub>2</sub> recovery, the implementation of further large-scale projects is intended to demonstrate the market position.

### Broad product portfolio

ASCO CARBON DIOXIDE LTD is a provider of customised and complete CO<sub>2</sub> solutions. The product portfolio includes automatic dry ice production machinery, CO<sub>2</sub> production plants and recovery systems, dry ice blasting equipment, CO<sub>2</sub> storage tanks, CO<sub>2</sub> cylin-

der filling plants, CO<sub>2</sub> vaporisers and other CO<sub>2</sub> accessories. Product development and service are built on two solid foundations: decades of practical experience in everything pertaining to CO<sub>2</sub> and dry ice, and a highly qualified and dedicated workforce. This unique combination of extensive expertise and broad product portfolio provides our customers with complete and customised solutions from a single source. The entire Messer Group relies on ASCO as its competence centre for CO<sub>2</sub> and dry ice.

[www.ascoco2.com](http://www.ascoco2.com)



**ASCO**  
All about CO<sub>2</sub>



## Messer Eutectic Castolin Group

### The Macroeconomic Environment and its Impact on Business Strategy

The global activities of the MEC Group are focused on many industry sectors. This gives the overall MEC business a wide customer base, spanning the globe and many industry segments. Our various products, services and technologies can be applied across many different manufacturing areas. Important signals for our future business development come especially from cyclical and commodity-heavy industry segments. For a large part of our business, a correlation can be seen between the sales performance of MEC business units and worldwide steel utilisation, as well as developments in the oil-, mining - and cement business.

In 2017, global economic growth continued. The sustained upswing is being driven forward, in particular, by the industrial nations, while economic growth in developing countries continues to evolve differently. The positive global trend has now also arrived in the economies of the Euro-zone and currently affects all member states. Compared to previous years, trade flows have significantly gained momentum. Thus, in 2017 they showed a return to growth over and above GDP. This is an indication that the upward phase is not being driven by private sector consumption alone but also by increased investments.

In the 2017 fiscal year, sales amounting to EUR 538.4 million are 3.1 % above the previous year figure. Despite the slight increase in overall sales, the Group's earnings were affected by strategic reorientations, especially in the Castolin Eutectic and BIT divisions in the year under review and therefore did not keep up with the growth rate of revenues. At the end of the 2017 fiscal year,

all Group business units had sizeable orders on hand that exceeded levels of the prior year.

Our investments are primarily geared towards use of sustained profitable growth potential. We invest in modernising our production and service facilities as well as our sales channels on a regular basis. The investments in long-term assets in the year under review concern all our divisions. With the investments made in the fiscal year 2017, we once again made an important contribution to the strategic direction of the Group. Thus, the Company is on solid ground and ready to face the challenges of the market.

Opportunities will arise for MEC and its diversified subsidiaries all over the world from the increased orientation towards high-yield industrial goods and services business. All factors that drive current and future global growth serve as the basis for the Group's continued strategic development. In addition to optimising the efficiency of each of our business units, we also see opportunities in synergistic effects arising from the interaction between our companies, regions and business units. This applies to an efficient administration, cost-saving and automated transaction processing of administrative tasks and the related shared use of the Group's local resources.

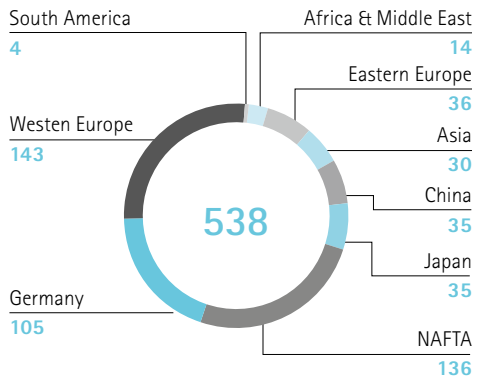
We consider digitalisation as an important macro trend which will continue to considerably change our business and the markets in the years to come. Our current strategies will make the group fit for these processes and enable us to successfully use the opportunities that will entail. Related risks are being taken into account. In order to meet all requirements of the European General Data Protection Regulation (GDPR) that is due to

come into force in May we have started to implement appropriate measures across our divisions.

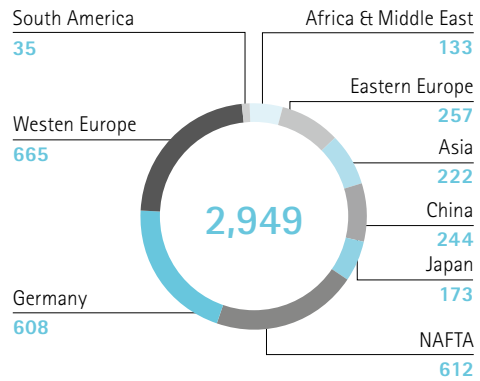
We continue to develop our company in an environment characterised by volatility in a way that will enable us to meet future challenges with competitively viable solutions.

### Key figures 2017

Sales of MEC Group by region  
in million of euros



Number of MEC Group employees by region  
as of 31.12.2017



## Castolin Eutectic

### Value Creation in Key Industries

Castolin Eutectic is a worldwide leader of application solutions in maintenance, repair and wear protection. More than 100 years of experience in welding, brazing and thermal spraying technologies stand for professional and innovative solutions.

The companies of the Castolin Eutectic business are globally active in all industrialized nations. This geographic diversification is accompanied by the diversification in various industries. The company develops, manufactures and distributes products and services around welding, soldering and thermal coating and thereby is well positioned to profit from booming markets. The development activities in the Castolin Eutectic field are geared towards the continuous enhancement of innovative solutions for specific applications in selected key industries and sectors.

The relatively young market segment „Services“ provides a number of possibilities. We offer our customers process applications in our own workshops with higher added value. Among other things with this service we want to strengthen customer loyalty. Castolin Eutectic always operates production facilities as close as possible to the respective customers. Manufacturing and service locations are to be found in Ireland, Poland, France, Italy, China, Singapore, the UK, UAE/ Dubai, USA, Canada, Mexico and Russia. The company further operates service workshops at numerous sites for various industrial applications in the areas of welding, soldering and thermal coating. A total of 832 staff members are currently employed in our industrial production facilities and service workshops (770 in the previous year). Because of modernizing and expanding production facilities over the

course of the previous fiscal years, the division has been able to maintain its competitive edge and to optimally respond to customer demands.

Our recent investment in expanding boiler coating activities has strengthened our market position and with the acquisition of Canada-based FMP we have been able to expand our know-how and product range to include organic sealants. Boiler coating activities are now a cornerstone of our growth strategy in the power, waste-to-energy and petrochemical industries.

Our high-performance global R & D departments have developed a great deal of new equipment, alloys and processes in recent decades, including Alloy®, a patented non-magnetic alloy boiler coating, the PTA torch and the TeroLink® application software.

Castolin Eutectic was able to increase its total sales by 3.2 % in the fiscal year 2017.

[www.castolin.com](http://www.castolin.com), [www.eutectic.com](http://www.eutectic.com)



## Messer Cutting Systems

### World of Excellence

Messer Cutting Systems has been developing and producing machines for cutting steel for over 100 years. Our machines are needed whenever thick material must be cut and we are seeing promising potential for a continued expansion of our business activities. There is a positive interplay between the globally produced volume of thick steel and the capacity utilisation of our customers. An increased output of steel and steel products will have a positive impact on our markets. There is also a clear connection between the replacement and spare parts business with the steel processing industry. Here, too, a higher steel production level makes a positive contribution to our markets.

After years of stagnating investment activities by their customers, Messer Cutting Systems were able to book a satisfactory order intake in almost all relevant markets. While our business activities are still being hindered by economic sanctions, we succeeded in gaining new customers and markets, not least because of new products and services. We have started a strategic investment initiative with a goal to further increase harmonisation of the product portfolio and our internal business processes.

The Messer Cutting Systems business unit was able to increase sales over the previous year by 4.4 %. We are also pleased to report that the company has been able to extend their share of sales in all relevant markets compared to the year before.

Laser-cutting of steel is still quite new and, compared to the traditional oxyfuel or plasma cutting methods, will continue to gain importance in future as. The develop-

ment of fibre laser cutting machines has, seen from the customer's point of view, significantly decreased investment costs for laser-cut sheet metal. This technological development opens new market segments to us.

The ongoing automation in our customers' plants makes it possible for our machines to be increasingly connected to automated material logistics systems. Automated and autonomous machines bring considerable efficiency gains to our customers in terms of cost saving potential. This trend allows us to widen our product range geared towards processes upstream and downstream from cutting. Electronically linking all these processes, often also labelled as "Industry 4.0" enables our customers to centrally control, monitor and optimise their production. This will lead to consequences for software and networking which in turn will continue to change our industry in the years to come. Ongoing digitalisation has created an increasing interconnection between previously separate value chains. We are already embracing this development as an opportunity and successfully implementing it in our Group. Innovations and enhancement of existing products are among the core drivers for success in safeguarding our market position.

Our global position, our production locations on five continents and our established product lines are the pillars of our position as the market leader. Messer Cutting Systems has production plants in Germany (headquarters), USA, Brazil, India and China. All our production sites operate with state-of-the-art technology. Extending our product lines by adding a wide range of smaller machines will enable us to address new potential customers for our products. Messer Cutting

Systems has production plants in Germany (headquarters), USA, Brazil, India and China. All our production sites operate with state-of-the-art technology.

[www.messer-cs.com](http://www.messer-cs.com)



**MESSER**   
Cutting Systems

## Spectron Gas Control Systems

### Innovative Manufacturer of Gas Control Systems

Spectron is a leading and innovative gas supply specialist for gas supply systems, offering customised solutions for a wide range of customer-specific requirements. Spectron covers clients' requirements from a simple valve for industrial gases up to fully automatic gas cabinets for semiconductor gases. The company also supplies alarm and control systems for gas applications, as well as gas purification systems to improve or secure the purity of the gases.

In addition to the headquarters based in Frankfurt, Germany, production and distribution centres are operated in Coventry, UK, and Shanghai, China. With its global network of sales and distribution partners,

Spectron is always close to the customer. The company's sales and result performance is characterised by steady growth.

[www.spectron.de](http://www.spectron.de)



**spectron**   
Gas Control Systems



## BIT Group

### Build Innovation Together

BIT develops and manufactures in-vitro diagnostic medical devices for the medical sector. These technologies have made significant advances in recent years. The decoding of human DNA has resulted in the development of new areas of application and rapidly expanding treatment methods. BIT profits from these trends as the company develops and produces the instruments needed to carry out modern analysis and diagnostic procedures.

BIT Analytical Instruments has production sites in Germany, USA and China. In order to strengthen its market position and safeguard profitable long-term growth, the company has been adopting the group work concept in their production facilities for a number of

years. Cutting-edge manufacturing processes and a continuous improvement process coupled with our Kaizen culture have contributed to efficient structures and increased productivity. We have started to establish a global supply chain within the BIT group to allow for a smooth intra-group process flow. A key component in the improved work integration at our locations has been the new ERP-system which was introduced at all our locations in the year under review.

BIT Group was able to maintain its previous year's sales level.

[www.bit-companies.com](http://www.bit-companies.com)



## Messer Medical Home Care

### Broad portfolio for the home care sector

Messer Medical Home Care Holding (MMHCH) offers products and services to prescribers and patients in selected European countries. These product and service offerings allow oxygen therapy at home, therapy for sleep apnea, monitoring for sudden death syndrome with small children, ventilation support and all training measures connected to these therapies.

Treating patients at home is key to health care systems across the world. It alleviates the strain on resources deployed in hospitals. Therefore home care is a solution for health care payers to manage cost and resources in a world whose population is ageing.

### Focus on home care

Within the Messer World, MMHCH concentrates solely on the home care area. In the past, these activities were integrated separately in the Messer Group, which made it difficult to focus and align them clearly. We will continue to develop and market innovative solutions for patients, doctors and health authorities.

We expect this to give us a sustainable and leading position in this emerging health sector. MMHCH currently has around 140 employees working day in day out dedicated to this mission.

[www.messer-medical.at](http://www.messer-medical.at)



Messer Medical  
Home Care 

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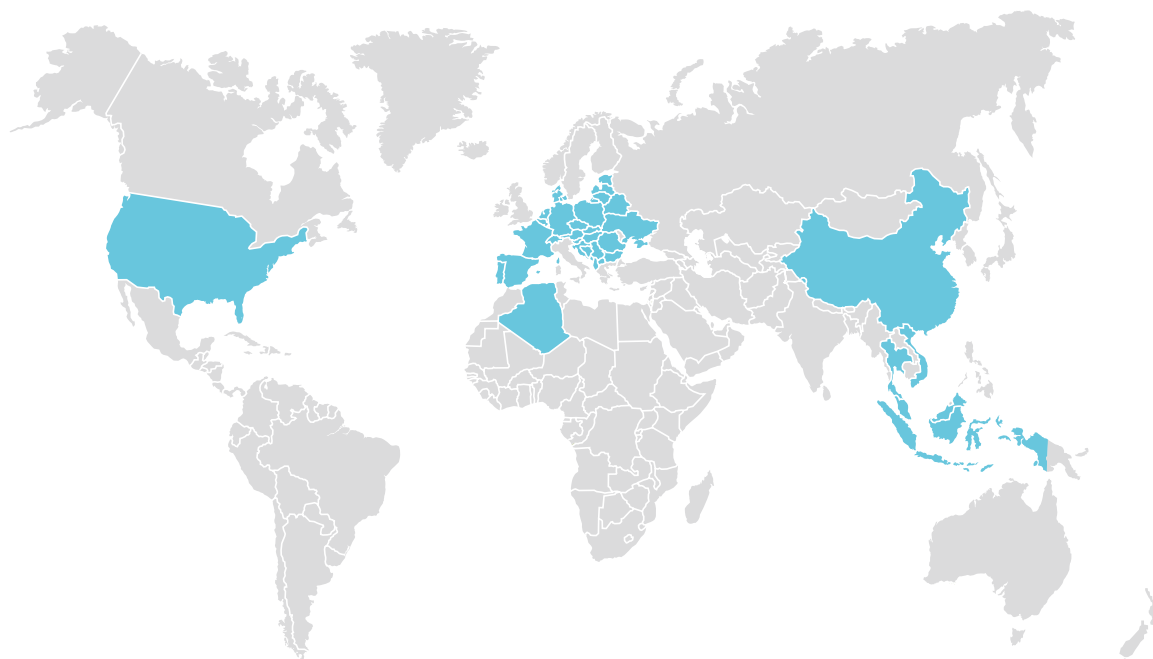
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